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CONTENTS

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REPORT OF THE COCONUT RESEARCH BOARD–1975

The present report is the fourth Annual Report of the Coconut Research Board established under Section 58 (i) of the Coconut Development Act No. 46 of 1971 by an Order published by the Minister of Plantation Industries in the Government Gazette of 30th March 1972.

The powers and functions of the Research Board have been specified in the said Order establishing the Board.

I. BOARD OF DIRECTORS

The following served on the Board of Directors during the year under review:

Dr. J. Sivapragasam (*Chairman*)*
Mr. A. J. W. Balthazaar†
Mr. P. W. R. de Silva
Dr. C. R. Panabokke
Dr. J. W. L. Peiris (*Acting Chairman with effect from 18-09-1975*)
Mr. A. E. Perera‡
Dr. O. S. Peries
Dr. R. O. B. Wijesekera (*from 30.04.75 — 09-12-75*)

* Resigned from the Board with effect from 3-09-1975
† Term ended on 30-03-1975
‡ Term ended on 01.08.1975.

Nine meetings of the Board of Directors were held during the year as follows :

No.	*Date*		*Venue*
32	15.01.75	(11.00 a.m.)	CRI, Bandirippuwa Estate, Lunuwila
33	28.02.75	(9.00 a.m.)	,, ,, ,,
34	24.03.75	(9.00 a.m.)	,, ,, ,,
35	30.04.75	(9.00 a.m.)	,, ,, ,,
36	30.05.75	(9.00 a.m.)	,, ,, ,,
37	10.07.75	(9.00 a.m.)	,, ,, ,,
38	01.08.75	(9.00 a.m.)	,, ,, ,,
39	07.11.75	(2.00 p.m.)	,, ,, ,,
40	09.12.75	(2.00 p.m.)	,, ,, ,,

II. STAFF MATTERS

A. Appointments and Promotions

Dr. U. Pethiyagoda was appointed Director of the Coconut Research Institute with effect from 01.02.1975. Mr. D. H. C. Dissanayake was released from the Rubber Control Department to take over the functions of Deputy Director (Administration and Finance) with effect from 09.12.1975 Mr. M. N. M. Ibrahim, B.Sc. Agric. (Cey.), Mrs. L. V. K. Liyanage, B Sc. Agric. (Cey.), and Mr. U. Samarajeewa, B.Sc. (Cey.) were recruited Research Assistants while Mr. D. E. F. Ferdinandez, M.Sc. (Wales) was promoted Research Assistant with effect from 1st August 1975.

B. Retirement

Dr. W. R. N. Nathanael retired from the post of Director with effect from 15.01.1975. He served as consultant to the Institute from 15.01.1975 to 15.04.1975.

C. On Training Abroad

Research Assistants, Messrs R. Mahindapala, N. T. M. H. de Silva and B. H. Rohitha continued to be on overseas training. Mr. S. Mohanadas, Research Assistant left the island on 8.03.1975 to do postgraduate studies in Plant Biochemistry at the University of Adelaide, Australia.

D. Returned from Training

Mr. M. S. S. Fernandopulle, Publications/Publicity Officer resumed duties on 30.09.1975 after successfully completing his postgraduate Diploma course in Journalism for Developing countries at the Indian Institute of Mass Communication, New Delhi and studies at the Central Plantation Crops Research Institute, Kasaragod, Kerala.

Mr. K. S. O. Perera, Technical Assistant, Division of Soils, returned to the island at the end of the year after successfully completing his Diploma in Soil Surveys at the International Institute for Aerial Survey and Earth Sciences, Enschede, Netherlands.

E. Conferences and Visits Abroad

Dr. M. A. P. Manthriratna, Botanist, visited the coconut plantations in Malaysia and the Central Plantation Crops Research Institute of India during a six week fellowship of the F. A. O. under the expanded programme of technical assistance.

Dr. U. Pethiyagoda, the Director was away from 6.9.75 to 9.10.75 attending the F.A.O. Conference on coconut held at Kingston, Jamaica.

III. OFFICIAL VISITORS TO THE INSTITUTE

During the year the Institute received 11,759 students from 156 schools, 55 university students and 54 visitors from overseas.

IV. LAND RECEIVED FROM THE LAND REFORM COMMISSION

During the year 266 acres of de Soysa Estate, Kirimetiyana were taken over by the Coconut Research Board.

V. RELEASE OF SEEDNUTS

A decision was made to enable the release of seednuts to prospective growers, in addition to the existing scheme for issue of seedlings from the Coconut Research Institute nurseries.

VI. NOTES ON REPORTS OF DIVISIONS

The following notes draw attention to points of interest relating mainly to the work of the Research Divisions of the Institute during the year :—

DIVISION OF SOILS

1. COCONUT NUTRITION AND MANAGEMENT TECHNIQUES

A. Field Experiments

(i) Long Term Field Experiments

Eight long term fertilizer experiments were maintained at Lunuwila, Madampe, Pallama, Bingiriya and Veyangoda.

Two experiments on the comparison of local (Eppawela) and imported (Saphos) phosphate fertilizers were commenced at Andigedera and Mahayaya Estates.

Yield data of the response curve experiment at Ratmalagara were statistically analysed for the period 1961—1973 and it was found that the dosage for maximum yield was 1.11 kg. sulphate of ammonia, 0.78 kg. saphos phosphate and 1.96 kg. muriate of potash per palm per year.

(ii) Soil Moisture Experiments

The two soil moisture experiments at Bandirippuwa and Ratmalagara Estates were continued.

B. Pot Experiments

(i) Eppawela apatite and saphos phosphate were compared in a glasshouse experiment. The test plant was *Paspalum commersonii.* Data on (i) the yield of dry matter, (ii) uptake of phosphorus and (iii) available phosphorus in the cropped soils were obtained. These data indicate that the efficiency of imported rock phosphate was between 2 to 3 times that of Eppawela apatite.

(ii) A Sand Culture Experiment on the effects of iron, manganese and reaction of the medium (pH) was continued. Differential treatments commenced in January, 1975 after the seednuts were cut and removed from the young seedlings. In July two replicates of the experiment were harvested and fresh and dry weights were determined. Root, rachis, midrib and lamina of the first and third leaf were sampled for nutrient analyses. The remaining replicate was sampled, in September for biochemical assay.

C. Laboratory Investigations

(i) Micronutrients in the developing fruit :

The sampling of fruits at different stages of development was continued and completed in February. Analysis of these samples is being continued.

(ii) Absorption of phosphorus by soils :

Studies on the absorption of P by five soils belonging to the major Great Soil Groups of Sri Lanka were carried out.

(iii) Chemical analyses of soils from the Division's fertilizer experiments (R/E and B/E) and from certain sites in the Negombo area were carried out.

(iv) Analyses of leaf samples from the fertilizer experiments at B/E and R/E were commenced.

D. Soil Survey

(i) Detailed reconnaissance soil survey of Negombo 1" sheet was commenced.

(ii) Detailed reconnaissance soil survey of Dandegamuwa 1" sheet was commenced.

(iii) Detailed soil surveys of the following areas were carried out:

(*a*) Mahayaya Estate (Division's Experiment)
(*b*) "300 palm block", Bandirippuwa Estate.
(*c*) "Calibration Curve Experiment", Ratmalagara Estate.
(*d*) Block No. 1 Letchemy Estate, Nattandiya.
(*e*) "Response Curve Experiment", Bandirippuwa Estate.

(iv) Soil Survey of a portion of Vanathavillu, Puttalam for the Coconut Cultivation Board.

DIVISION OF BOTANY AND PLANT BREEDING

2. HYBRIDIZATION AND SELECTIVE BREEDING

A. Controlled Pollination

This was carried out at seven stations. A summary of the pollination work is given below:

Number of female flowers pollinated: 214,247 (consisting of 111,382 *typica* × *pumila* and 102,865 *typica* × *typica*) (prepotent crosses), 278 samples of *typica* (prepotent) and 250 of *pumila* pollen were issued to private seednut producers. 24,550 *typica* × *typica* and 17,573 *typica* x *pumila* seednuts resulting from crosses done in 1974 were harvested during the year.

B. Research Nurseries

The following numbers of seednuts were laid during the year.

typica × *typica*	23,257
typica × *pumila*	14,048

This year 32,504 hand pollinated seedlings were issued consisting of 1321 *typica* × *typica*, 24,193 *typica* × *pumila* and 6989 *typica* × *Ivory Coast dwarf*.

C. Mother Palm seed supply

The Planting Division nurseries were supplied with about 1.7 million selected mother palm seednuts.

Six estates on which mother palms had earlier been selected were re-assessed. Earlier selections retained and new ones made totalled 12,781.

D. Isolated Seed Garden, Ambakelle

Emasculation work was started again in fields 5 and 9. A total production of about 41,000 *pumila* × *typica* seednuts was anticipated from emasculations done. This works out at approximately 50 nuts per palm.

E. Coconut Seed Garden Expansion Project

Routine maintenance work was carried out in fields 10—14. Wild boar, porcupine and field rats have been responsible for several casualties in the newly planted area and pest control measures have been intensified.

F. Second Seed Garden, Horakelly

Work commenced in January with a census of palms. Cutting of duds and poor palms was continued throughout the year, followed by planting of selected pumila seedlings in field No. 7.

DIVISION OF CHEMISTRY

3. NUTRIENT CONTENT IN THE LEAF

(i) Diurnal and seasonal variation of leaf nutrients

The analytical work on 1800 samples collected to study the diurnal and seasonal fluctuations in nutrient concentration of the leaves of adult palms (ordinary tall) to determine the ideal time of leaf sampling for foliar diagnostic analysis, was completed during the year.

All samples collected under this experiment were analysed for N. For the analysis of P, K, Ca and Mg samples from five (5) trees were bulked together at random, for convenience of analysis.

Preliminary statistical analyses of the data showed that there was no significant fluctuations in nutrient concentration during the day but all elements showed significant seasonal fluctuations.

(ii) Effect of irrigation on leaf nutrient concentration

With a view to studying the changes in leaf nutrient concentration of coconut with irrigation, samples were collected from the mid portion of the 1st, 6th, 9th and 14th leaves, from an irrigation experiment at Ratmalagara Estate.

240 samples were collected from the 60 palms under different irrigation treatments.

Chemical analyses for the major nutrients N, P, K, Ca and Mg on 160 of the samples collected are new complete and the remaining analyses are in progress.

(iii) Variation in nutrient concentration between and within leaflets

Samples for this study was done on one occasion from adult palms.

(a) 20 healthy palms from the Progeny Trial at Walpita were chosen for this study.

(b) Every tenth leaflet from one side of the rachis was taken and each leaflet was then subdivided into three parts (base, middle and apex) enabling comparison between different leaflets and between different parts of the leaflet.

(c) The fourteenth leaf was sampled for this study.

DIVISION OF AGROSTOLOGY

4. PASTURE DEVELOPMENT

A. Nitrogen Fixation by cover crops

Of the three most popular legume species, *Centrosema pubescens* appears to be best suited for use in association with pasture and fodder grasses due to its growth and branching habits. However, very little work has been done on nitrogen fixation by legumes under tropical conditions. Therefore an experiment was done to study initially the nitrogen fixing ability of *C. pubescens* at different levels of nitrogen supply. The plants were grown in Mitscherlich pots in the glasshouse and inoculated with rhizobia from healthy stands of *C. pubescens*. Preliminary data indicate that this legume is capable of fixing appreciable quantities of nitrogen. Pot experiments are also in progress to study transfer of fixed nitrogen from the legume to grass plants growing in association with it.

B. Pasture and fodder management

All long term pasture and fodder trials at Ratmalagara and Bandirippuwa Estates were managed to schedule. A new trial was set up at Sirikandura Estate, Dodanduwa to study the performance of four fodder and five pasture grasses under coconut receiving ample rainfall. Observations made so far clearly show that *B. miliiformis* is far superior to the other varieties tested in establishment and initial growth.

A virus resistant strain of *Digitaria decumbens* (Pangola grass) was obtained during the last quarter and planted in the field for propagation and observation. A pot trial was commenced to study the response of this strain to levels of added nitrogen and frequencies of defoliation.

Pasture land was prepared at Bandirippuwa Estate to set up a trial to compare the milk production of Sinhala × Jersey cross bred cows fed only on fertilized *B. miliiformis* pasture with the normal practice of feeding on estate grass and concentrates.

Pasture samples were taken at different points within the coconut square to determine the variation in growth in relation to variation in light intensity within the square.

Weed Biology

Work commenced during the latter part of the year on a study of the biology of four persistent and troublesome weeds found in the coconut growing areas. These weeds are *Pennisetum polystachyon* (foxtail grass, mana grass) *Imperata cylindrica* (Illuk) *Mimosa pudica* (sensitive plant) and *Eupatorium odoratum* (Podisingho maran).

Mimosa pudica seeds display dormancy and the phenomenon is being studied.

DIVISION OF INTERCROPPING

5. CROPS OTHER THAN GRASSES

(i) Intercropping trials on estates

The economic evaluation of selected intercropping treatments under coconut is being continued at Delgolla, Kirimetiyana and St. Peter's Estate, Ingiriya. Related trials in association with newly planted coconut are being carried out at Koodaluagara, Mulleriyawa and Crumo, Madurankuli.

(ii) Livestock project, de Soysa Estate, Kirimetiyana

Pasture has been established on 75 acres under coconut. Necessary buildings will be constructed and dairy and animal husbandry programmes of the Institute will be centralised at this site.

(iii) Agronomic trials on promising candidate crops for intercropping

Detailed trials on passion fruit, castor, cocoa, lemon grass, manioc and other root crops are in progress.

(iv) Soyabeans

We continued to collaborate with the University of Illinois, U. S. A. in the International Soyabean Varietal (INTSOY) Trial at two sites (Ratmalagara Estate and de Soysa Estate).

CROP PROTECTION DIVISION

6. CROP PROTECTION

A. Pests

Biological control of coconut caterpillar, Coconut Scale and *Eupatorium odoratum* was the major activity of the division while preliminary studies on chemical control of pests were carried out on a small scale.

(i) Coconut caterpillar, *Nephantis serinopa*

Infestations of the pest were confined to a few plantations in the N. W. P., W. P. and S. P. while in the E. P. even though the pest infestations were on the decline more of new infestations were reported. Mass breeding and releases of parasites were continued at the parasite breeding stations at Lunuwila and Mylambavely. Preliminary laboratory and field trials were carried out using bacterial and chemical insecticides. A consignment of a prepupal parasite (*Elasmus nephantidis*) was obtained from India, multiplied in our insectaries and released in estates.

(ii) Coconut Scale, *Aspidiotus destructor*

Numerous complaints of Coconut Scale attack were received from the N.W.P., W. P. and S. P. Spraying was not done. The exotic predators *Chilochorus cacti*, *Cryptognatha nodiceps* and *Lindorus lophantae* were multiplied and released at some points of infestation. Indigenous predators and parasites in most of the pest infested areas were found to be bringing the pest under control. None of the exotic predators has established in any area. There were instances when two of the indigenous predators had been parasitised and these parasites were identified by the Commonwealth Institute of Entomology.

A preliminary trial was carried out to study the effect of kerosene oil-emulsion on larvae and adults of indigenous and exotic predators of the pest.

(iii) Red weevil, *Rhynchophorus ferrugineus*

Several reports of damage by red weevil were received. Preliminary laboratory and field trials were commenced to find alternative insecticides to Metasystox for injection of infested coconut palms. 'Bidrin' and 'Azodrin 60' were found to be effective. Red weevil adult traps continued to be tested in one estate.

(iv) Leaf miner, *Promecotheca Cumingi*

The pest continued to be found in small number in the majority of the previously infested areas. Parasites were found to be maintaining pest populations within safe limits in those areas. At Katunayake, a considerable area was found affected by the pest. Although alarming numbers of adults were noticed at one time, the eggs and larvae within the mines were found to be heavily parasitised.

(v) Nettle Grub

No infestations of this pest were reported although larvae were seen in small numbers at one location. In this instance no control measures were necessary as natural enemies were observed in the field. A few parasites collected were identified.

(vi) Stem borer, *Xyleborus similis*

A complaint of attack by this pest was received from one estate in the Northern Province. Chemical control was recommended.

(vii) Other pests

Mites, mealy bugs and yellow spotted locust attacks were reported from a few estates. Necessary control measures were recommended.

B. Diseases

(i) Leaf Scorch Decline

Palms showing symptoms of "Leaf Scorch Decline" were observed widely distributed in many parts of Sri Lanka. A trial on the effect of improved drainage on the condition of affected palms continued at Gonapinuwala.

Injection of the chemical "Wiltrol" has not shown any improvement in the condition of the affected palms at Bandirippuwa.

(ii) Bud Rot, Stem bleeding and Leaf blight

A few reports of the incidence of these diseases were received and necessary control measures were recommended.

(iii) Ganoderma Basal stem rot

No new complaints were received during the year. A joint research paper on this disease was read at the sessions of the Sri Lanka Association for the Advancement of Science.

C. Biological Control of *Eupatorium odoratum*

The exotic insect *Ammalo insulata* has established well in several estates. Several acres of *Eupatorium odoratum* were completely defoliated a few months after releases were made. A laboratory culture of this insect was maintained, in addition to multiplication and field releases in many parts of the country. Some natural enemies of the beneficial insect were collected from the field and identified.

Apion brunneonigrum, a small weevil which destroys the flowers of *E. odoratum* was imported from the Commonwealth Institute of Biological Control and released on *Eupatorium* in the Puttalam District.

BIOMETRY UNIT

7. STATISTICS AND CROP FORECASTING

A. General

A statistical service was provided to the Research Divisions. Crop forecasting and maintenance of production statistics were continued. Three meteorological stations at Bandirippuwa, Ratmalagara and Ambakelle Estates were operated.

B. Research

The Unit also engaged in studies designed to evaluate the relationship between crop yield and comparable vegetative and reproductive characters, the effects of irrigation and thinning of developing nuts on total production.

Efforts are also being made to define a factor for conversion of weight of freshly picked, husked and split nuts to copra.

PLANTING DIVISION

8. ISSUES OF PLANTING MATERIALS

A. Seednuts

The Planting Division maintained 15 nurseries during the year. A total of 1,963,761 seednuts were laid down in the nurseries for seedling issues during May/June and October/November 1975 seasons.

Season	*Seednuts*
May/June 1975	420,860
October/November 1975	1,542,901

A decision was made during the year to enable the issue of seednuts to any interested grower.

B. Seedlings

Orders were booked and payments were received for 980,750 seedlings in 1975.

1,115,729 seedlings were issued from the nurseries during the year.

PUBLICATIONS/PUBLICITY UNIT AND LIBRARY

9. PUBLICATIONS

A. Journals

The printing of the publication "Pol Pawath" Vol. VI No. 1 was nearing completion at the end of the year under review.

B. Advisory Leaflets

With the assistance of the National Metrication Authority, steps were taken during the last quarter of the year to introduce metric measurements into the CRI Advisory leaflets. Apart from this the routine work of revising and reprinting of advisory leaflets was carried out as and when found necessary in order to update the subject matter and maintain the stock position.

Dr. U. PETHIYAGODA
Director

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REPORT OF THE DIVISION OF SOILS – 1975

A. FIELD EXPERIMENTS

1. 4 × 4 × 4 NPK Experiment on Adult Palms — Bandirippuwa Estate (Commenced November 1960)

The annual manuring due in November 1974 was not done, owing to the non-availability of fertilizer at that time. However, this manuring was carried out in June 1975. The manuring for the year 1975 was omitted.

The data for the year show significant response to phosphorus and potassium.

The main effects are shown in Table A 1.

Table A 1. *Yield data for 1975 - kg copra/ha - 163 palms/ha. Copra yields adjusted by covariance analysis*

Treatment per palm/year		*kg Copra/ ha*	*%*	*Difference kg Copra/ha*
N_0	(0.000 kg ammonium sulphate)	1329	100.0	—
N_1	(1.103 kg „ „)	1384	104.1	55
N_2	(2.206 kg „ „)	1392	104.7	63
N_3	(3.309 kg „ „)	1396	105.0	67
P_0	(0.000 kg saphos phosphate)	1185	100.0	—
P_1	(0.826 kg „ „)	1424	120.2	239*
P_2	(1.652 kg „ „)	1433	120.9	248*
P_3	(2.478 kg „ „)	1458	123.0	273**
K_0	(0.000 kg muriate of potash-60% K_2O)	919	100.0	—
K_1	(0.376 kg „ „)	1381	150.3	462***
K_2	(0.752 kg „ „)	1565	170.3	646***
K_3	(1.128 kg „ „)	1635	177.9	716***

*' **' *** significant at P O.05, P 0.01 and P 0.001 respectively.

2. 3 × 3 × 3 NPK Experiment on Young Palms — Ratmalagara Estate (Commenced December 1948)

The annual application of fertilizer was done in November 1975.

Potassium gave a significant response at the 5% level. The main effects for the year are recorded in Table A 2.

Table A 2. *Yield data for 1975 — kg copra/ha, 136 palms/ha*

Treatment per palm/yr.	*kg copra/ ha*	*%*	*Difference kg copra/ ha*
N_0 (0.681 kg ammonium sulphate)	2789	100.0	—
N_1 (1.362 kg „ „)	2724	97.7	-65
N_2 (2.043 kg „ „)	2677	95.9	-112
P_0 (0.454 kg saphos phosphate)	2671	100.0	—
P_1 (0.908 kg „ „)	2769	103.6	98*
P_2 (1.362 kg „ „)	2749	102.9	78
K_0 (0.681 kg muriate of potash — 60% K_2 0)	2621	100.0	—
K_1 (1.362 kg „ „)	2730	104.2	109*
K_2 (2.043 kg „ „)	2839	108.3	128**

Significant difference at P 0.05 = 94.2 kg copra/ha
*, **, *** significant at P 0.05, P 0.01 and P 0.001 respectively.

3. 4 × 4 × 4 NPK Experiment on Young Palms — Pothukulama Research Station (Commenced December, 1960)

The annual manuring was carried out in October 1975. There was significant response to nitrogen, phosphorus and potassium fertilizers. The main effects are presented in Table A3.

Table A 3. *Yield data for 1975 — kg copra/ha 178 palms/ha*

Treatment per Palm/ Year	*kg copra/ ha*	*%*	*Difference kg copra/ha*
N_0 (0.000 kg ammonium sulphate)	2733	100.0	—
N_1 (1.103 kg „ „)	3063	112.1	330*
N_2 (2.206 kg „ „)	2909	106.4	176
N_3 (3.309 kg „ „)	2790	102.1	57
P_0 (0.000 kg saphos phosphate)	2676	100.0	—
P_1 (0.826 kg „ „)	2879	107.6	203
P_2 (1.652 kg „ „)	2949	110.2	273
P_3 (2.478 kg „ „)	2992	111.8	316*
K_0 (0.000 kg muriate of potash — 60% K_2 O)	2640	100.0	—
K_1 (0.454 kg „ „)	2777	105.2	137
K_2 (0.908 kg „ „)	3015	114.2	375*
K_3 (1.362 kg „ „)	3064	116.1	424*

Significant difference at P 0.05 = 314.9 kg/ha
* Significant at P 0.05.

4. Experiment on Forms of Nitrogen and Phosphorus and Frequency of Manuring — Pothukulama Research Station, Pallama (Commenced June 1967)

The half-yearly application of fertilizer due in May-June was not carried out, due to unavailability of fertilizer on time. The plots receiving half-yearly doses were given the full dose when the annual manuring was done in October-November.

The 1975 yield data was adjusted for pre manurial leaf counts by covariance analysis. As the sodium nitrate plots received sulphate of ammonia since 1972, they were included in the sulphate of ammonia treatment.

Analysis of variance showed no significant difference between treatments. The adjusted yield data are given in Table A 4.

Table A 4. *Yield data for 1975 — kg copra/ha — 178 palms/ha copra yield adjusted by Covariance analysis*

Treatment	Annual Manuring			Biannual Manuring		
	kg copra/ ha	%	Difference kg copra/ ha	kg copra/ ha	%	Difference kg copra/ ha
Control	2386	100.0	—	2386	100.0	—
Ammonium sulphate + Saphos phosphate	2849	119.4	463	2469	103.5	83
Ammonium sulphate + Super phosphate	2861	119.9	475	2659	111.4	273
Urea + saphos phosphate	2611	109.4	225	2255	94.5	-131
Urea + superphosphate	2160	90.5	226	2540	106.5	154

5. 5 × 5 × 5 NPK Experiment on Adult Palms — Naiwala Estate, Veyangoda (Commenced July 1967)

The annual manuring was done in July 1975. As in the past years, potassium showed highly significant response.

The estimated yield data (from production function) for the year appears in Table A5.

Table A 5. *Estimated yield data for 1975 — kg copra/ha —178 palms/ha*

Treatment per palm/ year		kg copra/ ha	%	Difference kg copra/ ha
N_0	(0.000 kg ammonium sulphate)	1544	100.0	—
N_1	(1.103 kg „ „)	1737	112.5	193
N_2	(2.206 kg „ „)	1819	117.8	275
N_3	(3.309 kg „ „)	1790	115.9	246
N_4	(4.412 kg „ „)	1650	106.9	106
P_0	(0.000 kg saphos phosphate)	1565	100.0	—
P_1	(0.826 kg „ „)	1659	106.0	94
P_2	(1.652 kg „ „)	1732	110.7	167
P_3	(2.478 kg „ „)	1781	113.8	216
P_4	(3.304 kg „ „)	1804	115.3	239
K_0	(0.000 kg muriate of potash—60% K_2 0)	955	100.0	—
K_1	(0.454 kg „ „)	1414	148.1	459
K_2	(0.908 kg „ „)	1790	187.4	835
K_3	(1.362 kg „ „)	2082	218.0	1127
K_4	(1.816 kg „ „)	2291	239.9	1336

6. 5 × 5 × 5 × 5 NPK Mg Experiment on Adult Palms — Marandawila Estate, Bingiriya (Commenced 1967)

No fertilizer was applied in 1974. The application of fertilizer for 1975, due in November, was advanced to July.

The yield data for the year show significant response to phosphorus at P0.05.

The main effects are given in Table A 6.

Table A 6. *Estimated yield data for 1975 — kg copra ha — 173 palms/ha*

Treatment per palm/year		*kg copra/ ha*	*%*	*Difference kg copra/ ha*
N_0	(0.000 kg ammonium sulphate)	2675	100.0	—
N_1	(1.103 kg „ „)	2263	99.6	-12
N_2	(2.206 kg „ „)	2626	98.2	-49
N_3	(3.309 kg „ „)	2564	95.9	-111
N_4	(4.412 kg „ „)	2476	92.6	-199
P_0	(0.000 kg saphos phosphate)	2351	100.0	—
P_1	(0.826 kg „ „)	2540	108.0	189
P_2	(1.652 kg „ „)	2665	113.4	314
P_3	(2.478 kg „ „)	2726	116.0	375
P_4	(3.304 kg „ „)	2722	115.8	371
K_0	(0.000 kg muriate of potash 60% K_2O)	2573	100.0	—
K_1	(0.454 kg „ „)	2565	99.7	-8
K_2	(0.908 kg „ „)	2578	100.2	5
K_3	(1.362 kg „ „)	2615	101.6	42
K_4	(1.816 kg „ „)	2673	103.9	100
Mg_0	(0.000 kg kieserite „)	2438	100.0	—
Mg_1	(0.681 kg „ „)	2581	105.9	143
Mg_2	(1.362 kg „ „)	2663	109.2	225
Mg_3	(2.043 kg „ „)	2682	110.0	244
Mg_4	(2.724 kg „ „)	2639	108.2	201

7. Comparison of Eppawela Apatite with Saphos phosphate — Mahayaya Estate, Makandura and Andigedara Estate, Bingiriya (Commenced June 1975)

The object of the experiments is to assess the locally available phosphate fertilizer (Eppawela apatite) as a source of phosphorus for coconut by comparing it with the presently used imported phosphate fertilizer (saphos phosphate).

The experiments are sited at Mahayaya Estate, Makandura in the Wet zone and Andigedara Estate, Bingiriya in the Intermediate zone. The soil at Mahayaya is an alluvium deposited on a lateritic gravelly soil overlying a laterite. The soil at Andigedara is a sandy loam.

The experimental layout is of randomized blocks. There are 3 blocks of 8 plots each. Each plot consists of 15 palms. The experimental plots are separated from each other by single guard-rows. Each source of phosphorus is tested at 4 levels.

The levels of phosphate application are as follows :-

Levels	*kg/palm/yr*	
	Eppawela apatite	*Saphos phosphate*
L_1	0.0	0.0
L_2	0.907	0.454
L_3	1.814	0.907
L_4	2.722	1.361

Each experimental palm is given a basal dose 1.134 kg ammonium sulphate and 1.361 kg muriate of potash (60% K_2O) per year.

At both sites pre-manurial picks were commenced in June. The first differential manuring at Mahayaya was done in November and at Andigedera in December.

8. Magnesium Fertilizer Experiment on Young Palms — Bandirippuwa Estate, Lunuwila (Commenced October 1972)

Owing to the unavailability of the young palms mixture on time, the first application of fertilizer, due in June, was carried out in August. Magnesium was supplied as kieserite—151.0 g (level 1) and 302.0g (level 2). Each seedling received 907.0g of young palm Mixture.

The second application of fertilizer for the year, due in December, was done in January, 1976. Kieserite was applied at the rate of 226.0g (level 1) and 452.0g (level 2) per seedling. Young palm mixture was also applied at 907.0g per seedling.

Leaf counts were taken in January and June and height measurements in December.

There was significant gain in height (P0.01) and increase in production of leaves (P0.001) for the magnesium treatment.

9. Fertilizer Experiment on Young Hybrid Palms — Bandirippuwa Estate (Commenced December 1973)

The first half-yearly manuring was carried out in July 1975 and the second in January 1976. The composition of the fertilizer mixture was: 113.5 kg of ammonium sulphate, 34 kg of saphos phosphate and 56.8 kg of muriate of potash (60% K_2O). The rates of application were :

Levels	*Quantity (kg per seedling per application)*
0	0
1	0.680
2	1.360
3	2.040

Leaf counts were taken in January and August.

10. Soil Moisture Experiments (Commenced in 1974)

The two experiments, one at Bandirippuwa and the other at Ratmalagara were continued. As the Neutron Moisture Probe was shared by Tea Research Institute and Land Use Division, it was not possible to take readings at the proper time.

B. POT EXPERIMENTS — BANDIRIPPUWA ESTATE

1. Sand Culture Experiment

Effect of Fe and Mn at two pH levels on the growth and nutrition of coconut seedlings (Commenced in September 1974).

The differential treatment commenced in January, 1975 after the seednuts were amputated. The treatments consist of 3 levels of Fe, 3 levels of Mn and 2 levels of nutrient pH. Measurements of growth were taken in January, at the commencement of differential treatment and again at harvesting.

In July, 1975 replicates II and III of the experiments were harvested to record fresh and dry weights, and also to collect samples for chemical analysis. Plants in replicate I were sampled in September 1975 for the biochemical assay.

Plants of replicate II and III were sampled for laminae, midribs and rachis in the youngest fully opened leaf and the third leaf from top. Root samples were also collected from each of these plants. The chemical analysis of these samples for N, P, K, Ca, Mg and micronutrients commenced after the materials were dried and powdered. In plants of replicate I, the laminae of the youngest fully opened leaves were taken and extracted with ethanol for an assay of amino acids, sugars, insoluble proteins, ammonium compounds, amides and nitrates. In these plants the root tips were sampled separately to determine the EDTA-extractable ferrous and ferric fractions of iron. The analytical work on these samples is being continued.

2. Comparison of Eppawela phosphate fertilizer with saphos phosphate fertilizer

The experiments comparing Eppawela apatite with saphos phosphate were continued. The two sources were tested at 4 levels — Eppawela apatite at 0, 2, 4 and 6 g/pot and saphos phosphate at 0, 1, 2 and 3 g/pot (a pot contained 2,000 g). A randomized block design with 4 replicates per treatment was used. The soil was a sandy loam (from Ratmalagara Estate) and the test plant was *Paspalum Commersonii.*

Despite the quantity of Eppawela Apatite, at corresponding levels, being double that of saphos phosphate, the performance of the apatite was inferior to saphos phosphate. Available phosphorus in the cropped soils from saphos phosphate treatments were clearly higher than from Eppawela apatite (Table B1). Though not significant, so were the yield of dry matter and uptake of phosphorus.

Table B 1. *Available phosphorus (Olsen's) — ppm P*

Mean of four replicates

Level	*Eppawela apatite*	*Saphos phosphate*
0	4.00	4.25
1	7.30	10.13
2	9.40	11.53
3	10.44	12.54

LABORATORY INVESTIGATIONS

1. Micronutrient studies on developing coconut fruit

The sampling of fruits from pre-selected inflorescence at Pothukulama Research Station was concluded in February 1975. The analysis of material for Fe, Mn, Cu, Zn and B is being continued.

2. Adsorption of phosphorus by soils

Phosphorus adsorption studies were extended to 10 more acid coconut growing soils belonging to the Ultisol, Alfisol and Entisol Orders. The data for all samples fitted the single site Langmuir adsorption isotherm when equilibrium P was less than 1 mg/ml, but showed some deviations at higher concentrations of P. The studies are being continued to relate the Langmuir adsorption parameters to soil properties.

3. Downward movement and transformation of soil phosphorus at Pothukulama Research Station

Soil samples were collected in March 1975, three months after fertilizer application, from the manured areas of 4 concentrated superphosphate, 4 rock phosphate and 2 control plots. Soil analysis is being carried out as in last year.

4. Chemical analysis of soil samples from the Soils Division field experiments

Soil samples from the manure circles of 3×3×3 NPK experiment at Ratmalagara Estate and Naiwala Estate were collected and analysis for available P (Olson's method), acid extractable P (Bray and Kurtz No. 1 method), total P, exchangeable K, acid extractable K (hot HNO_3 and cold H_2SO_4), total K, and pH were carried out.

5. Leaf analysis from fertilizer experiments

14th leaf samples were collected from the 3×3×3 NPK experiment at Ratmalagara, and 4×4×4 NPK experiment at Bandirippuwa, and analysis for N, P, K Ca and Mg were commenced.

D. SOIL SURVEY

1. Detailed reconnaissance soil survey of Negombo 1" topographical sheet

The final map and report of this survey is being prepared and it will be published soon. This survey was carried out under the National Soil Survey Programme by Mr. A. S. Amarasinghe in collaboration with the Land Use Division of the Irrigation Department of Sri Lanka.

Seventeen soil series were identified and the general descriptions of these are given below.

Soils of the Coastal Plain Beach (0–4% slopes)

(a) *Negombo Series :* Level to sloping, excessively drained, very deep, light brown to light yellowish brown sandy soils derived from beach and dune sands.

(b) *Weliketiya series :* Level, imperfectly to poorly drained, deep, brown to dark greyish brown sandy soils, underlain by peat or clayey material or both, derived from beach sands.

Soils of the Coastal Plain Lagoon (0–1% slopes)

(a) *Puttalam Series :* Level, moderately well drained to imperfectly drained, deep, light yellowish brown to dark greyish brown, very fine sandy soils derived from Lagoon deposits.

(b) *Wagura Series :* Level, poorly to very poorly drained, deep, greyish brown to black peaty soils derived from Lagoon deposits.

(c) *Tudella Series :* Level, imperfectly to poorly drained, sands and organic fibrous material underlain by peat, muck or clayey material derived by artificial filling with sands and fibrous materials.

Soils of the Coastal Sand Plain (0–2% slope)

(a) *Mampitiya Series :* Level to nearly level, well drained, deep, brown to dark red coarse loamy over fine lomy soils derived from quaternary beach or near shore deposits.

(b) *Rathupasa Series :* Level to nearly level, somewhat excessively drained, very deep, reddish brown to dark red sandy to coarse loamy soils derived from quaternary beach or near shore deposits.

(c) *Ekela Series :* Level to nearly level, moderately well drained to imperfectly drained, deep, light greyish brown to yellowish brown coarse loamy over fine loamy soils derived from quaternary beach or near shore deposits.

(d) *Katunayake Series :* Level to nearly level, imperfectly drained, deep greyish brown to light yellowish brown sandy to coarse loamy soils derived from quaternary beach or near shore deposits.

(e) *Sudu Series :* Level to nearly level, poorly drained deep, light grey to greyish brown sand derived from quaternary beach or near shore deposits.

Soils of the Flood Plain (0—2% slopes)

(a) *Halpe Series :* Level to nearly level, moderately well to imperfectly drained, deep, dark brown to brown or pale brown sandy soils derived from alluvium.

(b) *Metikotuwa Series :* Level to nearly level imperfectly drained, very deep, yellowish brown to dark brown fine loamy to clayey soils derived from alluvium.

(c) *Toppuwa Series :* Level to nearly level, poorly to very poorly drained, deep, light grey to greyish brown clayey soils derived from alluvium.

Soils of the Mantled Plain Vijayan (0—20% slopes)

(a) *Boralu Series :* Gently sloping or moderately steep, well to moderately well drained, deep soils with yellowish brown to dark brown, sandy to loamy surface horizons with hard ironstone gravels over brownish red to red hard ironstone gravel over yellowish clayey subsoil with strong reddish mottles derived from colluvium and residuum from Vijayan gneiss.

(b) *Boralu Series (shallow phase) :* Same as above except depth to gravel less than 45 cm.

(c) *Pallama Series :* Gently sloping, moderately well to imperfectly drained, deep, dark brown to yellowish brown, coarse loamy over fine loamy soils with occasional hard ironstone in the upper part and soft ironstone in the lower part of the profile derived from colluvium and residuum from Vijayan gneiss.

(d) *Gampaha Series :* Level to nearly level, poorly to very poorly drained, moderately deep to deep light grey to yellowish grey, clayey soils with strong reddish mottles in the subsoil, derived from colluvium and local alluvium.

2. Detailed Soil Surveys of Soils Division Experimental Blocks

(a) Comparison of Eppawela apatite with saphos phosphate at Mahayaya Estate, Makandura. Only one soil was identified. The soil is an alluvium.

(b) Comparison of Eppawela apatite with saphos phosphate at Andigedera Estate, Bingiriya. Three soils were identified.

3. Detailed Reconnaissance Soil Survey of Dandegamuwa 1" Topographical Sheet

The Western half of the sheet was completed.

4. Detailed soil Survey of 300 palms block at Bandirippuwa Estate

A study on the influence of soil type and selected soil morphological properties on the yield of coconut was conducted at Bandirippuwa Estate, Lunuwila which is located in the Intermediate rainfall zone of Sri Lanka. A 2 hectare block of coconut land consisting of 300 adult palms was selected for this study. Each palm in this land received the same management from 1933 till 1952.

A detailed soil survey carried out on this land showed that there are four soil types which are some of the major soil types of the coconut growing areas of Sri Lanka. The four soil types are : (i) Sudu series (ii) Boralu series (iii) Pallama series and (iv) Boralu series (shallow phase). The corresponding average yields (kg copra/palm/yr) for the period 1943-1952 were : (i) 16.9 (ii) 13.7 (iii) 11.0 and (iv) 9.4.

The effects of soil depth, gravel depth (depth at which gravels appear), soil texture and drainage and their interactions on coconut yield were determined. Yield depended on soil and gravel depths (depth at which gravel begins to appear) only in light textured and better drained soils. Gravel depth influenced yield only in shallow soils (< 120 cm). Texture affected yield when the depth of soil or gravel was shallow or the drainage was good. Yield was dependent on drainage only in heavy textured soils. A technical paper on these findings is published in the Ceylon Coconut Quarterly.

E. MISCELLANEOUS

The following papers were published in scientific journals or presented in scientific meetings :

(1) Loganathan, P., A. S. Amarasinghe and V. Abeywardena (1975). Influence of soil type and selected soil morphological properties on the yield of coconut (*cocos nucifera*) in Sri Lanka. I Bandirippuwa Estate, Lunuwila. *Ceylon Coconut Quarterly* **26, 108-117**

(2) Loganathan, P., and T. S. Balakrishnamurti (1975). Response of coconut (*Cocos nucifera*) to N, P and K fertilizer application from the time of field planting on a lateritic gravel soil in Sri Lanka. *Ceylon Coconut Quarterly* **26, 89-98**

(3) Loganathan, P., and W. J. Maier (1975). Some surface chemical aspects in turbidity removal by sand filtration. *J. American Water Works Association.* 67 : 336—342.

(4) Arulanandan, K., P. Loganathan, R. B. Krone (1975). Pore and eroding fluid influences on surface erosion of soil. *Journal of the Geotechnical Engineering Division* ASCE 101 : 51—66.

(5) Loganathan P., (1975). Management of Ultisols with special reference to coconut. Paper presented at the Annual Sessions of the Soil Science Society of Ceylon. Submitted for publication in the *Proceedings of the Soil Science Society of Ceylon.*

(6) Balakrishnamurti, T. S., (1975). Comparison of Eppawela Apatite and rock phosphate. Paper presented at the Annual Sessions of the Sri Lanka Association for the Advancement of Science.

F. PERSONNEL

The following appointments were made during the year:

Mr. R. M. P. T. Perera, Laboratory and Field Attendant 1st August 1975.

Mr. A. Perera, special labourer 1st August 1975.

P. LOGANATHAN
Soil Chemist

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REPORT OF THE DIVISION OF BOTANY AND PLANT BREEDING – 1975

1. BREEDING AND SELECTION

1.1 Controlled pollination work

Two types of crosses were done at the seven pollination stations which were in operation during the year, *viz. typica* × *typica* (prepotent) and *typica* × *pumila*. The number of female flowers pollinated at the different stations is indicated in table 1, and it is anticipated that 35 percent of these will develop into seednuts.

Table 1. *Summary of controlled pollination work*

Station	*No. of female flowers pollinated*	
	typica × *pumila*	*typica* × *typica*
Bandirippuwa	6,174	2,990
Ratmalagara	—	4,632
Walpita	33,009	13,734
Andigedera	25,214	17,328
Horrekelly	31,372	17,020
ISG, Ambakelle	—	45,638
Achchitotam	15,613	1,523
Total	111,382	102,865

42,123 seednuts from crosses done in 1974 were harvested. These consist of 17,573 *typica* × *pumila* and 24,560 *typica* × *typica* seednuts. 278 samples of *typica* (prepotent) and 250 samples of *pumila* pollen were issued to private sector and public sector estates for use on their own pollination programmes.

1.2 Research Nurseries

23,257 *typica* × *typica* and 14,048 *typica* × *pumila* seednuts were planted in the nurseries. Seedlings issued for the two planting seasons is indicated below:

Planting Season	*Type of planting material*		
	typica × *typica*	*typica* × *pumila*	*typica* × *Ivory Coast Dwarfs**
May/June ...	56	9,136	4,514
October/November ...	1,265	15,057	2,475
	1,321	24,193	6,989

* Mainly for 2.0 hectare "Observation blocks" in the different coconut growing areas.

1.3 Performance of CRIC 65 typica × pumila F_1 hybrids

1.3.1 The performance of hybrids has been reported on in previous Annual Reports. The first hand pollinated experimental material produced by the Institute is now 25 years old and the yield for the period 1972 - 1974 is given below.

Table 2. *Mean yield per palm of TYPICA × PUMILA F_1 progeny for a three year period*

Year	*YIELD*	
	No. of nuts	*Wt. per husked nut (g.)*
1972	151	680
1973	131	595
1974	127	624

1.3.2 A 0.8 hectare observation block of *typica* × *pumila* hybrids was planted at Bandirippuwa Estate in May 1963 on a 7.3 m × 7.3 m square layout. It was subsequently decided to thin out the plantation to give a conventional density of 158 palms per hectare. Although some mediocre palms have been removed without supplying the vacancies thus created, the effects of overcrowding in the initial stages of growth, particularly towards the centre of the plantation are evident. Yield figures of this block for a eight year period are given below:

	YEAR							
	1968	*1969*	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*
Mean yield of palms	58	57	83	95	92	63	102	105
+Yield per hectare	9,164	9,006	13,114	15,010	14,536	9,954	16,116	16,590

(+Calculated on the basis of 158 palms/hectare)

A mean yield of 9,164 nuts per hectare *in the 5th year after transplantation*, and a yield of 16,590 nuts per hectare in the 12th year is indeed satisfactory. An even higher yield is anticipated when the palms have recovered from the effect of high density planting to which they have been subjected for 12 years.

1.3.3 Another observation block of hybrids was established at Bandirippuwa Estate in May 1969 in the form of an underplantation, observing the standard recommendation for progressive removal of the senile plantation. The planting material consisted of 228 *typica* × *pumila* selected seedlings and 245 *pumila* × *typica* natural cross seedlings from the Ambakelle Seed Garden, planted in two adjacent blocks but without any statistical layout. The period for initial flowering of the two types of material is indicated in table 3.

Table 3. *Flowering patterns of (a) TYPICA × PUMILA (b) PUMILA × TYPICA F_1 hybrids*

	Period for flowering (Months) and % palms in flower		
	36	54	60
(a) *typica* × *pumila*	12.1	27.7	42.2
(b) *pumila* × *typica*	31.5	59.4	80.0

Although reciprocal differences for the character period taken for initial flowering are brought out in this trial, this may be due to (a) environmental effects particularly soil (b) some of the later flowering *typica* × *pumila* hybrids may be the result of imperfect pollinations and hence illegitimate seed of *typica* × *typica*. Yield figures will be reported on when four years data is available.

1.4 Mother Palm Seed Supply Scheme

1,686,747 selected mother palm seednuts were supplied to the Planting Division nurseries. These nuts were from mother palms located in private sector and public sector estates. Almost 200,000 selected seednuts were supplied from the Coconut Seed Garden, Ambakelle. Re-selection of palms commenced in 1970, and this year 12,781 palms from six estates were identified as suitable sources of seed. This number would consist of new selections as well as some of the original selection which had not lost their potential to any appreciable extent.

1.5 Coconut Progeny Trials

1.5.1 **Coconut Progeny Trial, Walpita.** Yield recording of individual palms was discontinued as sufficient yield data is now available.

1.5.2 **Coconut Progeny Trial, Bandirippuwa.** This trial was planted in 1959, and aims to identify high yielding (prepotent) palms by comparison of the yield performance of the open pollinated progeny of 125 selected mother palms from Bandirippuwa, Ratmalagara, Letchemy, Achchitotam and Marandawila Estates.: The growth and initial flowering of this plantation were delayed, possibly a reflection of the environment, for this was planted on impoverished soil with impeded drainage for most times of the year. As the plantation is now in reasonably full-bearing, weight of husked nuts will be recorded commencing with the first pick in 1976, and an analysis of the yield data may be possible in a short time.

2. SEED GARDENS

2.1 Coconut Seed Garden, Ambakelle

2.1.1 Besides routine maintenance of the planted area, recording of husked-nut weight of individual palms was commenced, using five-nut samples per palm at each pick. Total weight of husked nuts, which is an indication of the production of a palm, will then be used in the next stage of rogueing the 47 hectares planted with *typica* × *typica* planting material.

2.1.2 Emasculation work for the mass production of natural cross *pumila* × *typica* seed was recommenced in Fields 5 & 9. 807 *pumila* palms were worked during the first quarter and 776 palms during the second & third quarters. 40,825 *pumila* × *typica* natural-cross hybrid seed is developing from emasculations during the period March — September 1975. This works out to approximately 50 nuts per palm for a seven month period. It may be still too premature to assess the nuts produced from emasculations during the period October-December.

2.1.3 **Coconut Seed Garden Expansion Project.** Routine maintenance work was carried out in fields 10 - 14 planted during the period 1972 - 1974. Mammalian pests such as wild boar, porcupine and field rats have been responsible for several casualties in the newly planted area and the pest control service has been intensified. Palms in fields 10A and 10B planted in June 1972 are in flower. However, as it is too premature to emasculate these palms, the entire inflorescence is cut off at the base before the spathe could burst. Fields 10A and 10B would be ready for systematic emasculation in 1977.

2.2 Second Seed Garden, Horrekelley

The first Seed Garden (Ambakelle) was established as a new plantation within a jungle such that there was 800 metres jungle barrier surrounding the plantation. The Second Seed Garden (Horrekelley) is being established on a different principle. A high yielding block of coconut has been selected and this is being interplanted with selected dwarf (*pumila*) seedlings, after removal of the duds, and poor palms, among the existing 'tall' variety (*typica*) plantation.

Work commenced in Field No. 7 consisting of 5,800 palms with a mean yield of 96 nuts per palm. 2,571 sub-standard palms were uprooted and destroyed and 5,132 dwarf (*pumila*) seedlings planted between existing rows of "tall" palms. In Field No. 6 (5,084 palms — mean yield 115 nuts per palm), 2,046 palms have been uprooted and destroyed. 368 dwarf

(*pumila*) seedlings have been planted and the remaining area is to be planted in May, 1976. Systematic yield recording of the remaining "tall" palms will commence in 1976, and the plantation will be further rogued on the character total weight of husked nuts. This will leave only the 'elite' *typica* palms as pollen parents for the production of *pumila* × *typica* hybrids.

3. NEW FIELD EXPERIMENTS

3.1 Progeny of the following crosses are under investigation in a field trial initiated this year:

(a) San Ramon x San Ramon.

(b) Forms of the variety *Nana* (*i.e. pumila, eburnea* and *regia*) crossed *inter se.*

(c) Progeny of *typica* × Ivory Coast dwarfs.

4. MISCELLANEOUS

The following investigations are in progress:

(a) Tissue culture of the coconut palm.

(b) Cytology of *Brachiaria miliiformis*

(*c*) Electrophoretic separation of coconut pollen proteins.

(d) Post-pollination fruit development in coconut (NSC Project in collaboration with the Dept. of Biological Sciences, Vidyodaya Campus, University of Sri Lanka).

(e) Differentiation of the shoot apex of *typica* × *typica* and *pumila* × *typica* hybrids.

5. PUBLICATIONS & CONFERENCES ETC.

5.1. The following papers were presented at the Fourth Sessions of the FAO Working Party on Coconut Production, Protection and Processing, Kingston, Jamaica (September—October 1975):

(a) "A comparative study of the growth, flowering and yield of (a) *typica* × *typica*, (b) *typica* × *pumila* and (c) *typica* (op) progeny."

(b) "Selective use of improved planting material for rehabilitating Sri Lanka's Coconut Industry."

5.2. A paper on "the reproductive patterns of varieties & forms of the coconut (*Cocos nucifera L.*) in Sri Lanka" by Mr. W. P. Bertie Fernando, Technical Assistant was submitted for publication in the Ceylon Coconut Quarterly.

Dr. M. A. P. MANTHRIRATNA
Botanist

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REPORT OF THE CHEMISTRY DIVISION – 1975

1. STUDY ON DIURNAL AND SEASONAL FLUCTUATIONS OF NUTRIENTS ON FOLIAR TISSUES

The details of the sampling procedures have already been recorded in the earlier Annual Report.

For the study of diurnal fluctuations in nutrients, sampling commenced at 0600 hours and was repeated at 3 hourly intervals upto 1800 hours (i.e. 5 samplings per day). This sampling was carried out on a predetermined date in each of the 12 months of the year. The object of this study was to determine the ideal time of the day for leaf sampling which would give the most consistent results. As there was no indication of diurnal variability, the mean daily values were used for an evaluation of the seasonal effects on leaf nutrient contents.

This was justified as sampling covered a one year period including both the dry and wet periods. All elements showed significant seasonal fluctuations.

The study revealed that leaf sampling could be done at any time of the day and the ideal time of sampling during the year covered the period August to September when nutrient fluctuations were minimal.

The results of chemical analyses for the major nutrients N, P, K, Ca and Mg together with the statistical analyses of the data are tabulated in Tables I to V.

2. EFFECT OF IRRIGATION ON LEAF NUTRIENT CONCENTRATION IN COCONUT

An experiment commenced by the Biometrician in 1973 to study the effect of irrigation on yield of palms with a standard fertilizer treatment was used to investigate possible changes in concentration of nutrients within the leaf as a result of irrigation.

The experiment was conducted at Ratmalagara Estate within the Intermediate rainfall zone on a sandy loam soil.

Twenty palms were selected from each of the yield categories 35—59; 60—84; and more than 85 nuts per palm per year (i.e. low, medium and high yielders). Four treatments were imposed on each of the yield categories, i.e. 5 palms from each yield group formed the basis of a treatment, control — no water, 400 litres (88 gallons) of water per palm per week, 400 litres (88 gallons) of water per palm fortnightly and 800 litres (176 gallons) of water per palm fortnightly. (88 gallons of water or 400 litres are equivalent to 5.08 cm of rainfall)

In order to study the responses of leaf nutrient concentration to irrigation, samples were collected from the mid portion of the 14th leaf, the leaf normally recommended for nutritional studies by IRHO. The sampling was done on one occasion. (6th September, 1974).

From the results of chemical analysis presented in Table VI there appears to be no discernible trend in changes in nutrient concentration between the different yield groups and treatments. It may be that the interval of one year from the commencement of treatment to the

time of sampling is insufficient to indicate any dramatic changes in the nutrient pattern. As the nutrient uptake and distribution may not be reflected uniformly over all leaves, it may be likely that any changes will affect the younger and less mature leaves.

It is therefore expected to repeat this study on younger fronds.

3. VARIATION IN NUTRIENT CONCENTRATION BETWEEN AND WITHIN LEAFLETS

Sampling for this study was done on one occasion from adult palms that have reached the productive phase.

(a) 20 healthy palms from the Progeny trial at Walpita were chosen for this study.

(b) Every tenth leaflet from one side of the rachis was taken and each leaflet was then sub divided into 3 parts (base, middle and apex) enabling comparison between different leaflets and between different parts of the same leaflet.

(c) The fourteenth (14th) leaf was sampled for this study.

Chemical analyses for the macro nutrient content (N, P, K, Ca and Mg) are in progress.

PERSONNEL

Mr. M. C. P. Wijeratne, Technical Assistant successfully completed the Laboratory Technicians Training Course conducted by the Institute of Chemistry, Sri Lanka.

Mr. S. Mohandas, Research Assistant, left for Australia on 8th March 1975, under a Colombo Plan Award. He is undergoing post graduate training in Plant Biochemistry at the Waile Agricultural Research Institute, the University of Adelaide.

Dr. U. Samarajeeva was appointed Research Assistant with effect from 1st September, 1975.

M. JEGANATHAN
Officer-in-Charge
Chemistry Division

Table 1. *Nitrogen as Percent Dry Matter*

Days	*0600 hrs*	*0900 hrs*	*1200 hrs*	*1500 hrs*	*1800 hrs*	*Mean*
72.03.03	2.09	2.03	2.01	2.12	2.07	2.06
72.04.19	2.08	2.08	2.05	2.10	2.13	2.08
72.05.23	2.25	2.15	2.11	2.08	2.14	2.14
72.06.23	2.26	2.28	2.30	2.37	2.32	2.30
72.07.26	2.33	2.33	2.31	2.35	2.32	2.32
72.08.25	2.31	2.22	2.26	2.21	2.20	2.24
72.09.25	2.17	2.18	2.22	2.23	2.21	2.20
72.10.28	2.29	2.25	2.18	2.23	2.20	2.23
72.11.29	2.29	2.28	2.26	2.26	2.23	2.26
72.12.28	2.24	2.26	2.23	2.21	2.23	2.23
73.01.30	2.46	2.41	2.46	2.52	2.49	2.46
73.02.28	2.43	2.40	2.40	2.39	2.35	2.39
Mean	2.26	2.23	2.23	2.25	2.23	2.24

C of V = 5.08%

Analysis of Variance

Source	*df*	*S.S.*	*M.S.*	*V.R.*	*Sig.*
Bn. days	11	4.3023	0.3911	30.08	* * *
Bn. hrs	4	0.0538	0.0135	1.04	
d x hrs	44	0.3581	0.0081		
Error	295	3.8488	0.0130		
Total	354	8.5630			

Table 2. *Phosphorus as Percent Dry Matter*

Days	*0600 hrs*	*0900 hrs*	*1200 hrs*	*1500 hrs*	*1800 hrs*	*Mean*
72.03.03	0.140	0.138	0.142	0.142	0.142	0.141
72.04.19	0.158	0.151	0.146	0.151	0.152	0.151
72.05.23	0.147	0.151	0.150	0.149	0.150	0.149
72.06.23	0.149	0.142	0.146	0.143	0.145	0.145
72.07.26	0.152	0.152	0.152	0.152	0.145	0.151
72.08.25	0.145	0.146	0.146	0.147	0.144	0.145
72.09.25	0.146	0.145	0.148	0.146	0.145	0.146
72.10.28	0.144	0.150	0.145	0.151	0.145	0.147
72.11.29	0.160	0.159	0.148	0.147	0.146	0.152
72.12.28	0.156	0.162	0.154	0.151	0.153	0.155
73.01.30	0.168	0.166	0.167	0.171	0.167	0.167
73.02.28	0.157	0.144	0.142	0.153	0.144	0.148
Mean	0.155	0.149	0.148	0.149	0.148	0.149

C of V = 5.14%

Analysis of Variance

Source	*df*	*S.S.*	*M.S.*	*V.R.*	*Sig.*
Bn. days	11	0.010126	0.00921	15.61	* * *
Bn. hrs	4	0.000465	0.000115	1.95	
d × hrs	44	0.003180	0.000072	1.22	
Error	285	0.016820	0.000059		
Total	344	0.030587			

Table 3. *Potassium as Percent Dry Matter*

Days	*0600 hrs*	*0900 hrs*	*1200 hrs*	*1500 hrs*	*1800 hrs*	*Mean*
72.03.03	1.157	1.188	1.159	1.283	1.223	1.202
72.04.19	1.321	1.382	1.323	1.399	1.256	1.336
72.05.23	1.342	1.252	1.313	1.332	1.355	1.318
72.06.23	1.359	1.371	1.367	1.396	1.354	1.369
72.07.26	1.383	1.383	1.392	1.383	1.421	1.392
72.08.25	1.321	1.321	1.350	1.341	1.608	1.348
72.09.25	1.392	1.404	1.479	1.429	1.379	1.415
72.10.28	1.358	1.342	1.366	1.354	1.346	1.353
72.11.29	1.408	1.408	1.422	1.433	1.358	1.407
72.12.28	1.408	1.416	1.392	1.346	1.350	1.382
73.01.30	1.466	1.489	1.566	1.650	1.475	1.528
73.02.28	1.508	1.404	1.383	1.283	1.396	1.395
Mean	1.364	1.357	1.368	1.374	1.355	1.364

C of V = 12.42%

Analysis of Variance

Soucre	*df*	*S.S.*	*M.S.*	*V.R.*	*Sig.*
Bn. days	11	1.492925	0.135720	4.73	* * *
Bn. hrs	4	0.017036	0.004259	—	
d × hrs	44	0.523710	0.011903	—	
Error	285	8.173895	0.028680		
Total	344	10.207566			

Table 4. *Calcium as Percent Dry Matter*

Days	*0600 hrs*	*0900 hrs*	*1200 hrs*	*1500 hrs*	*1800 hrs*	*Mean*
72.03.03	0.339	0.332	0.303	0.301	0.298	0.315
72.04.19	0.335	0.331	0.338	0.329	0.324	0.331
72.05.23	0.324	0.309	0.296	0.314	0.313	0.311
72.06.23	0.337	0.336	0.328	0.349	0.324	0.334
72.07.26	0.333	0.356	0.323	0.341	0.334	0.337
72.08.25	0.324	0.325	0.319	0.330	0.318	0.323
72.09.25	0.316	0.339	0.323	0.331	0.323	0.326
72.10.28	0.322	0.329	0.327	0.325	0.325	0.326
72.11.29	0.349	0.334	0.331	0.310	0.308	0.326
72.12.28	0.326	0.333	0.336	0.338	0.331	0.332
73.01.30	0.366	0.411	0.406	0.334	0.336	0.371
73.02.28	0.345	0.356	0.328	0.343	0.363	0.346
Mean	0.333	0.338	0.326	0.328	0.323	0.330

C of V = 14.62%

Analysis of Variance

Source	*df*	*S.S.*	*M.S.*	*V.R.*	*Sig.*
Bn. day	11	0.055415	0.005038	2 16	*
Bn. hrs	4	0.009027	0.002257	—	
d × hrs	44	0.040821	0.000928	—	
Error	285	0.664746	0.002332		
Total	344	0.770009			

Table 5. *Magnesium as Percent Dry Matter*

Days	*0600 hrs*	*0900 hrs*	*1200 hrs*	*1500 hrs*	*1800 hrs*	*Mean*
72.03.03	0.217	0.203	0.191	0.194	0.176	0.196
72.04.19	0.187	0.208	0.203	0.205	0.183	0.197
72.05.23	0.182	0.186	0.180	0.181	0.176	0.181
72.06.23	0.190	0.195	0.201	0.205	0.193	0.196
72.07.26	0.202	0.208	0.200	0.209	0.205	0.204
72.08.25	0.198	0.201	0.187	0.190	0.201	0.195
72.09.25	0.220	0.195	0.198	0.198	0.188	0.199
72.10.28	0.173	0.189	0.188	0.185	0.180	0.183
72.11.29	0.187	0.198	0.191	0.187	0.176	0.187
72.12.28	0.175	0.194	0.182	0.188	0.191	0.186
73.01.30	0.203	0.240	0.225	0.194	0.199	0.212
73.02.28	0.208	0.203	0.194	0.199	0.208	0.202
Mean	0.195	0.199	0.193	0.194	0.189	0.194

C of V = 19.80%

Analysis of Variance

Source	*df*	*S.S.*	*M.S.*	*V.R.*	*Sig.*
Bn. days	11	0.023878	0.002171	1 46	*
Bn. hrs	4	0.003906	0.000977	—	
d x hrs	44	0.019747	0.000449	—	
Error	285	0.422888	0.001484		
Total	344	0.470419			

Table 6. *Nutrients in the Fourteenth Leaf from the Irrigation Experiment*

Yield of nuts/palm/year		% in dry Matter *N*	*P*	*K*	*Ca*	*Mg*
		Control Palms				
35 — 59	...	2.15	0.138	0.938	0.447	0.320
60 — 84	...	2.21	0.148	1.238	0.438	0.278
Above 85	...	2.20	0.157	1.183	0.333	0.248
Mean	...	2.19	0.148	1.120	0.406	0.282
		Palms Irrigated with 400 Litres (88 Gallons) of Water per Palm per Fortnight				
35 — 59	...	2.19	0.137	1.058	0.358	0.291
06 — 84	...	2.08	0.141	1.258	0.329	0.232
Above 85	...	2.20	0.140	1.308	0.311	0.223
Mean	...	2.16	0.139	1.208	0.333	0.249
		Palms Irrigated with 400 Litres (82 Gallons) of Water per Palm per Week				
35 — 59	...	2.14	0.157	1.080	0.381	0.277
60 — 84	...	2.04	0.137	0.973	0.357	0.272
Above 85	...	2.15	0.155	1.088	0.372	0.272
Mean	...	2.11	0.150	1.047	0.370	0.274
		Palms Irrigated with 800 Litres (176 Gallons) of water per Palm per Fortnight				
35 — 59	...	1.94	0.136	1.033	0.455	0.285
60 — 84	...	2.11	0.146	1.138	0.373	0.245
Above 85	...	2.15	0.141	1.120	0.343	0.274
Mean	...	2.07	0.141	1.097	0.390	0.268

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REPORT OF THE AGROSTOLOGY DIVISION – 1975

INTRODUCTION

During the year under review the two glass-houses were recommissioned and soil nutrient studies and legume nitrogen fixation studies were commenced. The forced air oven at Bandiruppuwa Estate (B/E) was repaired and put into working order during the middle part of the year. During the early part of the year when the oven was not in working order trials were conducted to find out whether harvested pasture samples could be dried to constant weight without loss of quality in (1) the sun and (2) the estate copra kiln. These methods were found to be unsatisfactory.

Soil Nutrient Studies

Cinnamon sand from Ekala was sampled and the following experiments were set up.

Experiment 1

This was a 2^5 factorial of two levels of N, P, K, Ca and Mg planted to *Paspalum commersonii*. The experiment was harvested on two occasions and the yield data are summarised in table 1.

Table 1. *Total dry matter yield of the two harvests of experiment 1 in gm per pot (mean of two replicates)*

			Ca_0		Ca_{10}	
			Mg_0	$Mg_{1\frac{1}{2}}$	Mg_0	$Mg_{1\frac{1}{2}}$
K_0	P_0	N_0	0.14	0.24	0.32	0.55
		N_5	0.06	0.11	0.73	0.71
	P_3	N_0	0.17	0.34	0.77	0.77
		N_5	0.11	0.17	1.08	1.56
K_3	P_0	N_0	0.26	0.22	0.64	0.55
		N_5	0.04	0.02	1.09	1.57
	P_3	N_0	0.40	0.32	0.85	1.01
		N_5	0.30	0.51	8.28	10.96

In the first harvest when the plants were 45 days old it was found that Ca was responsible for high increase in yield. After the first harvest the P^H of the soil was measured and this is given in table 2. The data indicate that the soil is deficient in all the tested nutrients and also has a very low buffering capacity.

Table 2. *The pH of soil after the first harvest of experiment 1*

			Ca_0		Ca_{10}	
			Mg_0	$Mg_{1\frac{1}{2}}$	Mg_0	$Mg_{1\frac{1}{2}}$
K_0	P_0	N_0	4.85	4.28	8.05	8.10
		N_5	3.93	3.84	7.20	7.71
	P_3	N_0	5.60	4.70	7.95	8.05
		N_5	3.85	3.80	7.45	7.65
K_3	P_0	N_0	4.38	4.00	8.00	8.00
		N_5	3.72	4.00	7.55	7.70
	P_3	N_0	5.35	4.70	8.00	7.95
		N_5	3.86	3.95	6.94	7.04

Experiment 2

This was a 2^5 factorial pot experiment of N, P, K, Ca and Mg planted to *Phaseolus lathyroides* with one replicate of all nutrients. The experiment was harvested on two occasions and the data are shown in table 3. Practically no growth was recorded in pots that received nitrogen in the absence of calcium.

Table 3. *Total dry matter yield of the two harvests of experiment 2 in gm per pot*

			Ca_0		Ca_{10}	
			Mg_0	$Mg_{1\frac{1}{2}}$	Mg_0	$Mg_{1\frac{1}{2}}$
K_0	P_0	N_0	0.41	0.43	1.14	0.62
		N_5	0.02	0.06	1.10	0.55
	P_3	N_0	0.08	0.90	1.29	1.86
		N_5	0.04	0.08	1.50	2.12
K_3	P_0	N_0	0.71	1.11	1.65	1.51
		N_5	0.06	0.07	1.23	1.24
	P_3	N_0	0.78	1.72	3.79	4.76
		N_5	0.08	0.26	2.73	7.90

Experiment 3

This was a 4^2 factorial pot experiment of four forms of nitrogen (Nil, NH_4NO_3, $(NH_4)_2SO_4$ and $CO(NH_2)_2$) and four forms of calcium (Nil, $Ca(OH_2)$, $CaCO_3$ and $CaSO_4$ planted to *Paspalum commersonii*. The experiment was harvested four times and the data are summarised in table 4. In the absence of nitrogen very poor yields were recorded. In the absence of calcium moderate yields were recorded for nitrogen applied is in the form of urea only.

Table 4. *Total dry matter yield of the four harvests of experiment 3 in gm per pot (mean of the two replicates)*

	Nil	NH_4NO_3	$(NH_4)_2SO_4$	$CO(NH_2)_2$
Nil	0.97	1.34	0.30	8.16
$Ca(OH)_2$	1.12	0.90	0.29	13.62
$CaCO_3$	1.52	13.85	13.62	11.40
$CaSO_4$	1.53	14.44	15.53	10.35

The same pattern continued even when calcium was added in the form of $Ca(OH)_2$. However, when calicum was added as $CaCO_3$ and $CaSO_4$ high yields were obtained with all three forms of nitrogen tested. Soil pH determinations done after the first harvest stage are summarised in table 5. As can be seen from these data the pattern of response to forms of nitrogen is directly related to the soil pH.

Table 5. *Readings of soil pH of experiment 3*

	Nil	NH_4NO_3	$(NH_4)_2SO_4$	$CO(NH_2)_2$
Nil	4.20	3.84	3.59	6.51
$Ca(OH)_2$	3.88	3.75	3.56	6.38
$CaCO_3$	7.54	6.87	6.18	7.77
$CaSO_4$	7.87	7.30	6.52	7.72

Experiment 4

This was 4^2 factorial of four levels of N (N_0 $N_{1\frac{1}{2}}$, N_3 and $N_{4\frac{1}{2}}$) and four levels of K (K_0, $K_{1\frac{1}{2}}$, K_3 and $K_{4\frac{1}{2}}$) with two replicates of all treatments planted to *Paspalum commersonii.* The experiment was harvested on three occasions and the data are summarised in Table 6. The data indicate that for optimum plant growth in this soil in addition to the other deficient nutrients an initial application of 376 kg/ha each of ammonium nitrate and potasium sulphate is necessary.

Table 6. *Total dry matter yield of the three harvests of experiment 4 in gm. per pot (mean of two replicates)*

	N_0	$N_{1\frac{1}{2}}$	N_3	$N_{4\frac{1}{2}}$
K_0	4.92	2.47	3.01	2.15
$K_{1\frac{1}{2}}$	8.47	8.60	10.24	11.50
K_3	2.98	9.39	11.26	13.43
$K_{4\frac{1}{2}}$	3.28	8.76	12.87	15.51

Experiment 5

This was a 2^5 factorial of N, P, K, Ca and Mg with two replicates of all treatments planted to *Paspalum commersonii.* This experiment was similar to experiment 1 except for the fact that nitrogen was applied in the form of urea. The experiment was harvested on two occasions during the year and the yield data are summarised in table 7.

Table 7. *Total dry matter yield of the two harvests of experiment 5 in gm. per pot (mean of the two replicates)*

			Ca_0		Ca_{10}	
			Mg_0	$Mg_{1\frac{1}{2}}$	Mg_0	$Mg_{1\frac{1}{2}}$
K_0	P_0	N_0	0.06	0.10	0.12	0.24
		$N_{2\frac{1}{2}}$	0.69	0.86	0.46	0.55
	P_3	N_0	0.13	0.27	0.46	0.36
		$N_{2\frac{1}{2}}$	0.18	0.37	0.96	1.67
K_3	P_0	N_0	0.05	0.08	0.27	0.23
		$N_{2\frac{1}{2}}$	0.90	0.60	0.85	0.62
	P_3	N_0	0.19	0.40	0.40	0.53
		$N_{2\frac{1}{2}}$	2.07	2.03	5.16	6.43

Experiment 6

This was a 2^5 factorial of Fe, Cu, Zn, Mn and Mo with two replicates of all treatments planted to *Paspalum commersonii*. The experiment was harvested once during the year and is in progress. The data collected so far are summarised in table 8.

Table 8. *Total dry matter yield of the thinnings and the first harvest of experiment 6 in gm. per pot (mean of two replicates)*

			Mn_0		Mn_1	
			Mo_0	Mo_1	Mo_0	Mo_1
Zn_0	Cu_0	Fe_0	9.14	9.56	9.91	10.87
		Fe_1	8.67	9.24	8.41	10.31
	Cu_1	Fe_0	10.76	10.48	9.87	9.79
		Fe_1	10.98	9.82	10.19	10.47
Zn_1	Cu_0	Fe_0	9.63	10.81	9.61	9.88
		Fe_1	8.97	10.02	9.02	8.43
	Cu_1	Fe_0	10.73	9.10	10.65	10.68
		Fe_1	10.34	10.09	11.02	10.69

LEGUME STUDIES

A glass house experiment was carried out during the year to study the fixation of nitrogen by *Centrosema pubescens* in enamelled iron pots containing washed sand. The design was a simple comparison of the four nitrogen treatments with each treatment replicated six times. All pots received an adequate supply of all nutrients except N. Two germinated seeds of *Centrosema pubescens* were planted in each pot and watered daily.

After establishment the plants were innoculated with rhizobia collected from the field. Fourty-five days after planting the plants were harvested for total dry matter production, number and weight of nodules formed and the total amount of nitrogen fixed in the system. Control pots without plants were used to monitor any change in the soil nitrogen status during the trial. The data collected are summarised in Table 9. The data show that considerable amount of nitrogen is fixed by this legume. However, at high soil nitrogen levels three is no net fixation of nitrogen and the available evidence suggests, that some nitrogen is lost by volatalization.

Table 9. *Number of nodules, dry weight of nodules, total dry matter yield and total nitrogen fixed by Centrosema pubescense plants in sand culture*

	N_0	N_1	N_2	N_3
Number of nodules	120	154	93	107
Nodule dry weight	1.4083	1.9644	1.5044	0.6841
Total dry Matter	26.6361	34.2321	28.4916	23.1249
Total Nitrogen fixed (gm)	.51823	.69391	.39335	.06512

PASTURE STUDIES

Three pasture trials (P_5, P_{12} and P_{22}) at Ratmalagara Estate, Madampe were terminated during the course of the year. The data are being analysed.

1. Experiment P 88 at B/E

This experiment compares three fodder grasses for their productivity and effect on coconut at four levels of applied nitrogen. The experiment was sampled for determination of dry matter production on two occasions towards the latter part of the year due to the non availability of the dehydrator during the early part of the year.

The dry matter yield for the two harvests is summarised in table 10.

Table 10. *Total dry matter yield of the two samplings in kg/ha (means of three replicates)*

		N_0	N_1	N_2	N_3
Pusa Giant	...	2118	3285	4443	3676
Guinea B	...	2522	3968	4550	4322
Setaria anceps	...	2820	3619	3584	3757

Nut yields of the palms and weight of copra in the plots receiving the different treatments were recorded and these data are given in table 11.

Table 11. *Number of nuts/ha/year and weight of Copra kg/ha/years*

		Number of Nuts/ha	*Weight of Copra kg/ha*
Pusa Giant	N_0	9750	1863.84
	N_1	7219	1461.49
	N_2	10014	2021.27
	N_3	11030	1973.94
Guinea B	N_0	10698	2031.31
	N_1	13782	2559.72
	N_2	9552	1891.10
	N_3	9710	2096.40
Setaria anceps	N_0	9500	1973.94
	N_1	11568	2394.04
	N_2	10489	2043.15
	N_3	10042	2133.69

2. Experiment P91 (R/E)

This experiment which compares the productivity and crude protein content of three fodder grasses due to two intensities of cutting (15.24 cm and 30.48 cm above ground level) and two frequencies of cutting (30 and 60 day intervals) was managed to schedule. The dry matter from five cycles of defoliation done during the year is summarised in table 12.

Table 12. *Dry matter yield in kg/ha/sampling*

Guinea B	I_1	F_1	2778.2
		F_2	6605.0
	I_2	F_1	2884.6
		F_2	5840.6
Pusa Giant	I_1	F_1	967.2
		F_2	4673.2
	I_2	F_1	945.8
		F_2	4231.4
Setaria	I_1	F_1	1583.6
		F_2	5625.2
	I_2	F_1	1558.4
		F_2	5617.2

Ref:

F_1 = 30 days

F_2 = 60 days

I_1 = 15.24 cm above ground level

I_2 = 30.48 cm above ground level

Crude protein analysis could not be completed during the year. Yield data continue to show Guinea B to be superior to *Pusa Giant Napier* and Setaria anceps in the semi dry areas.

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REPORT OF THE INTERCROPPING DIVISION – 1975

GENERAL

During the year under review the three intercropping projects (two in the wet zone and one in the intermediate zone) which were set up in 1974 were maintained. One new project was set up in the dry zone at Madurankuliya. The rainfall in the intermediate zone was very poor and most of the crops planted failed to yield a harvest.

INTERCROPPING PROJECTS

The main objectives of these projects set up in private lands are to study the feasibility and economics of intercropping coconut lands with different crops in the three rainfall zones of the coconut growing areas.

WET ZONE INTERCROPPING PROJECTS

1. Koodaluagara Estate project, Mulleriyawa

This project studies the economics of intercropping newly planted coconut with different cash crops. The coconut seedlings were planted in avenues of 12.2 metres apart. The following crops were planted and studied at this project during the year :

1. Manioc
2. Banana
3. Turmeric
4. Papaw
5. Sweet potato
6. Colacasia
7. Green gram
8. Chillies
9. Brinjal
10. Bandakka

The crop that produced the highest income was manioc. Papaw, green gram and sweet potatoes performed very poorly during both seasons. The total recurrent expenditure on the project during the year was Rs. 8169.29 and the sale of produce from the crops harvested registered an income of Rs. 5165.34.

2. St. Peter's Estate project, Ingiriya

St. Peter's Estate received a rainfall of 4864 mm during the year. This heavy rainfall promoted the spread of several fungal diseases in the crops planted. They were identified and controlled. The crops planted in the project during the year are as follows :

1. Manioc
2. Sweet Potato
3. Colacasia
4. Turmeric
5. Banana
6. Radish
7. Sorghum
8. Papaw
9. Passion fruit
10. Coffee

The total recurrent expenditure in this project during the year was Rs. 9515.56 and the income derived from the sale of produce was Rs. 4817.76.

INTERMEDIATE ZONE INTERCROPPING PROJECTS

Delgolla Estate project

This project is situated on a 4.05 ha block of land from Delgolla Estate in Kirimetiyana. The soil is lateritic gravel and very shallow. The objectives of this project are to study the economics of intercropping in the intermediate zone to identify the crops suitable for the region, to study the yields that could be obtained from these crops and to find out whether there are any adverse effects due to these intercrops on coconut production. The following crops were planted in the project during the year :

1. Cowpea MI—35
2. Sorghum IS—2941
3. Chillies MI—1
4. Green gram MI—3
5. Sweet potato — Wariyapola
6. Plantain— Ambul and Kolikuttu
7. Manioc
8. Colacasia
9. Maize T—48
10. Bandakka H—10
11. Luffa
12. Bushitauo
13. Pineapple

Most of the crops were severely affected by the failure of the monsoon rains. Two wells were constructed at the project to provide supplementary irrigation during times of stress. Manioc was the only crop that could withstand the drought. The total expenditure on the project during the year was Rs. 32,274.80 and the income from the sale of produce was only Rs. 15,412.82.

In addition to this project agronomic trials on intercrops were done at Ratmalagara Estate, Madampe and Kirimetiyana Estate, Lunuwila. The crops investigated were Soyabean under the International Soyabean varietal project, Passion fruit, Manioc, Castor and Lemon grass.

Animal Husbandry

The rotational cross breeding project of Sinhala cattle was continued during the year. 105.3 ha of land from Kirimetiyana Estate were taken over for the purpose of continuing this project. During the year 30.375 ha of pasture were established there and plans were prepared to put up a dairy building. The herd strength at the end of the year was as follows :

Cows	—	118
Bulls	—	4
Heifer calves	—	192
Bull calves	—	41
Total	—	355

During the year there were 108 births and 27 deaths. 51 culled animals were sold during the year. 123,488 pints of milk were produced during the year which was sold to the Milk Board after meeting the requirements of the resident staff.

D. E. F. FERDINANDEZ
Officer-in-Charge
Division of Intercropping

Ceylon Cocon. Q. (1976) 27, 36-41
Printed in Sri Lanka

REPORT OF THE CROP PROTECTION DIVISION – 1975

Biological control of the Coconut caterpillar, Coconut Scale and the weed, *Eupatorium odoratum* was the major activity of the Division, while studies on chemical control were preliminary and were carried out on a small scale.

1. PESTS

1. Coconut caterpillar, Nephantis serinopa Meyr. (Cryptophasidae)

Pest incidence in the North Western Province, Western Province and the Southern Province had been very low while in the Eastern Province, severe infestations occurred. Mass breeding and release of parasites have been done by the parasite breeding stations at Lunuwila and Mylambavely (Table 1). The prepupal parasite, *Elasmus nephantidis* was imported from India, bred and released, but no recovery has been made at the release cities. Preliminary studies carried out revealed that parasitism of *N. serinopa* eggs in the laboratory by the parasite, *Trichogramma braziliensis was* over seventy-five per cent. Even though release were not made, *Trichospilus pupivora* was observed to parasitise heavily the pupae of the pest in the Western Province, *Microbracon brevicornis* was recovered for the first time from an estate in the North Western Province. Several thousands of this parasite were released in the past but no recoveries were made earlier.

Laboratory trials using four formulations of the bacterium, *Bacillus thuringiensis* Berliner against *N. sarinopa* were concluded. The formulations used were Dipel, Thuricide, Biotrol and Bactospeine in wettable powder form. Very high mortality of larvae was observed when they were fed with coconut leaves sprayed with suspensions of these four formulations. Mortality increased with concentration and time. The L.D. 50 (Conc.) decreased with time in all four formulations (Table 2). However it was noted that most of the caterpillars did not stop feeding soon after ingestion of sprayed leaves. In view of the promising results obtained from these preliminary trials, further studies on the use of this bacterial pathogen appear to be well justified.

Table 1. *Field releases of parasites of the Coconut Caterpillar, nephantis serinopa*

Name of Parasite		*E.P.*	*W.P.*	*S.P.*	*N.W.P.*	*Total*
Perisierola nephantidis	...	27,365	180	2160	2340	32,045
Eriborus trochanteratus	...	11,131	300	—	2350	13,781
Spoggosia bezziana	...	5,988	520	—	4993	11,501
Trichogramma braziliensis		17,95,200	8,33,800	—	20,08,400	46,37,400
Elasmus nephantidis	...	—	—	—	2,690	2,690
Total	...	18,39,684	8,34,800	2160	20,20,773	46,97,417

Table 2. *LD_{50} at different intervals after spraying. Dosage in g 125 cm³ water*

			4th Day	*8th Day*	*12th Day*	*16th Day*
Dipel	...	...	0.714	0.3904	0.3101	0.2199
Thuricide	...	...	1.134	0.7624	0.4485	0.2507
Biotrol	...	...	1.768	1.279	0.4057	—

At the lowest concentration used (0.33g/125 ml water) 64% cumulative mortality was obtained.

			5th day	*9th day*	*15th day*
Bactospeine	...	...	1.882	1.335	0.7303

An attempt was made to study the effects of systemic insecticides on the caterpillar population by injecting trunks of pest infested palms. Hundred per cent mortality of caterpillars was observed eleven days after injection on five palms, each palm receiving 6ml cm³ of 'Azodrin 60' (monocrotophos) diluted with water. Also leaflets from a treated palm were fed to caterpillars in the laboratory for different periods and mortality observed. The insecticide was found to remain effective in controlling overlapping generations of the pest for at least four months (Table 3).

Table 3. *Effects of 'Azodrin 60' on N SERINOPA larvae from palm injections*

Laboratory assay thro' control feeding			*Field assay from palm infesting larvae*		
Date of feeding	*% mortality*		*Date of treatment—75.12.05*	*% Survival*	
	treated	*Control*	*Post treatment observations date*	*treated*	*Control*
75.11.24	100	9	75.12.05	87	87
75.12.10	73	15	75.12.16	10	45
76.01.20	86	—	76.01.08	6	67
76.01.30	80	5	76.01.21	00	251
76.02.04	95	4	76.02.06	00	75
76.02.12	93	27	76.02.20	00	23
76.02.19	65	15	76.02.27	00	0
76.03.19	97	10	76.03.04	00	0
76.05.07	79	59	76.03.11	00	0
76.05.12	30	50	76.04.05	00	20
76.05.19	43	29	76.04.19	00	4
76.06.18	11	23	76.05.04	00	14
			76.05.19	12	7
			76.06.01	21	58
			76.06.08	29	50
			76.06.22	12	8

1.2 Coconut Scale. *Aspidiotus destructor* **Sign (Diaspididae)**

Several reports of attack by Coconut Scale were received from the North Western Province, Western Province and Southern Province. No chemical control was attempted.

The exotic predators, *Cryptognatha nodiceps, Lindorus lophanthae* and *Chilocorus cacti* were mass bred and released in Scale infested areas, mostly in their adult stage (Table 4).

Table 4. *Field releases of predators of A. destructor*

	N.W.P.	W.P.	S.P.	Total
C. nodiceps ...	8066	—	1950	10,016
L. lophanthae ...	7047	300	—	7,347
C. cacti ...	558	—	—	558

Subsequent to field releases, regular monthly observations were made at the release points. These predators were not recovered. The indigenous predators, *Chilocorus nigritus* and *Pullus xerampelinus* Muls, and the indigenous parasite, *Aphytis chrysomphali* Mercet were found in considerable abundance in most of the Scale infested ares. They multiplied fast and brought the Scale infestation under control in all the estates. The parasite appears to be an important natural enemy of the Coconut Scale. It is generally well distributed throughout Scale infested areas and is adequately adopted to climate over a broad range.

1.2.1 Parasite of indigenous predators

In the field, larvae and pupae of *C. nigritus* and *P. xerampelinus* Muls. were found parasitised. Mummified and live larvae, also pupae of these predators were brought from various places to the laboratory and observed for emergence of parasites.

Homalotylus flaminius Dalman (Encyrtidae) was found in considerable abundance, parasitising larvae and pupae of *C. nigritus* at Wariyapola, Nikadalupotha, Ambakela and Ja-ela. In the laboratory this insect readily parasitised the larvae of *C. nigritus*. *Lygocerus* sp. (Ceraphronidae), a hyperparasite was found to be a parasite of *H. flaminius* in the field.

Syntomosphyrum sp. near *obscuriceps* F (Eulophidae) is another larval parasite of *C. nigritus* commonly found in Scale infested areas.

The percentage of parasitism of larvae and pupae of *C. nigritus* in five estates in the months of July to September, by the above two parasites, ranged from eleven to twenty-eight with an average of eighteen.

Aminellus indicus Kerrich (Encytidae) was observed to be a pupal parasite of P. xerampelinus Muls. commonly found in the field.

1.2.2 Effect of soap-kerosene oil emulsion on predators of Coconut Scale

Despite effectiveness of predators in reducing Scale populations, severe outbreaks do occasionally occur, which may necessitate spraying on a limited scale. Hence the effect of kerosene oil — soap emulsion on the four main predators was studied.

Kerosene oil soap emulsion was prepared by mixing the ingredients in the following proportions:

Kerosene oil = 2 *l*
Water = 1 *l*
Soap = 50 *g*

The stock solution was diluted ten times with water. The four predators tested were :

C. nigritus
P. xerampelinus
C. nodiceps
L. lophanthae

Twenty larvae and thirty adults comprised a test batch. Spraying with tap water constituted the control treatment. The treatments were replicated thrice. Mortality counts were made at twenty-four hour intervals for a period of seven days. In the case of larvae, mortality was complete by the time the first pest spraying observation was made (Table No. 5).

From the second to the seventh day after spraying, the death rate of adults was negligible and mortality was observed only on the first day after spraying. Some treated adults of the four species of predators were fertile after treatment when supplied with fresh Coconut Scales. It was observed that the tolerance of adult predators to the emulsion was high, though larval mortality was hundred per cent. As complete coverage by spraying in the field is not normally achieved, the adult predators will be able to survive by feeding on Coconut Scale which escaped spraying.

1.3 The coconut leaf miner pest, *Promecotheca cumingi* Baly. (Hispidae)

The pest continued to be well under control in all the previously affected areas. A favourable stable state of balance between the pest and the larval parasite, *Dimmockia javaanica* has been attained. However, at the end of the year, near the International Airport at Katunayake, an area of about seventy-five acres far away from the previous infestation were found heavily infested. Even though several parasitised larval mines were seen adults of the pest were found in very large numbers during the latter part of the year. This was problably due to new introduction through air traffic. There the parasites have appeared unaided, moving in naturally from an affected area and bringing the pest under control gradually.

1.4 The Red Weevil, *Rhynchophorus ferrugineus* F. (Curculionidae)

Several complaints of pest attack were received. As metasystox was not available for some time, preliminary laboratory and field trials were carried out to find alternative insecticides for injection of the pest infested palms. The systemic insectcides Dicrotohpos and Monocrotophos were found to be effective. In one palm which died despite treatment with monocrotophos, seventy-five larvae, one pupa and five adults were found dead when the trunk was split open indicating that the palm could have survived if treated at an early stage of pest infestation.

Mites belonging to *Macrocheles* sp. (Macrochelidae) and *Fuscuropoda* sp. (Uropodidae) were found associated with Red weevil adults in the field in many localities. However, their role in causing harmfull effects to the pest is unknown.

Nettle grub. Parasa lepida Cram. (Limacodidae)

No complaints of pest infestation were received. In one estate a very small population of larvae was seen, No control measures were adopted, as natural enemies were present. From parasitised larvae in the field, *Apanteles parasae* Rohwer (Braconidae) were collected.

1.5 Mites

Raoiella indica Hirst, a small mite was found to occur in large numbers and to cause damage to the ventral surface of leaves of about one year old seedlings in two estates in the Western Province. In the glass-house at the Headquarters (Bandirippuwa Estate, Lunuwila) in addition to the above species, two other mites namely *Tetranychus* sp. and *Oligonychus* (Reckiella) sp. were found on leaves of coconut seedlings. The infested leaves turned yellow and dried up prematurely. *Stethorus keralicus* Kapur, a coccinellied predator was found associated with these mites. However this predator did not increase in numbers sufficiently to prevent damage caused by mites.

1.6 Mealy bugs

Three different species of mealy bugs were found associated with coconut palms. Mealy bugs of *Palmicultor* sp. were found in large aggregations deep within the crown of 17 three to four year old palms at Nawadhoruwatte, Akwatte, Nelundeniya in the Kegalle District. Four to six of the youngest leaves were severely damaged in each palm. Some damaged leaves were as small as 30 cms to 45 cms in length. Zigzagging of some leaflets was also seen in affected leaves. The infested leaves had dried up for a greater part of their length.

The Mealy bug, *Pseudococcus citriculus* Green was observed on leaves of seedlings in the glass-house of the Institute at Bandirippuwa in February. Ants belonging to the species *Tapinoma melanocephalum F.* were found associated with them. These mealy bugs were brought under control by spraying a solution of Fenitrothion. However these mealy bugs appeared again in large aggregations in August. Localised chlorotic patches developed on leaves at the feeding points. In many estates in the North Eestern Province and Western Province, these mealy bugs were found on leaves of adult palms too. Ants belonging to the species *Technomyrmex detorquens* Walk were found associated with them.

Inflorescences of some coconut palms in the North Western Province were infested with mealy bugs of Dysmicoccus sp. No visible damage could be noticed. Ants belonging to *Crematogastor* sp. were found associated with these mealy bugs.

1.7 Batrachedra sp. (*Momphidae*)

Lervae of Batrachedra sp. were observed to damage female flowers by feeding and caused shedding at Kakkapalliya.

2. DISEASE

2.1 Leaf Scorch Decline

Palms showing symptoms of "Leaf Scorch Decline" were found widely distributed in many parts of the country. At Bandirippuwa Estate itself there were one hundred and thirty two palms, showing symptoms of this disorder, of which about nineteen were in the advanced stage of decline. Pre-bearing young palms were also found to be affected by this disorder.

The trial on the effect of improved drainage for recovery of affected palms was continued in the Southern Province.

Injection of the chemical "Wiltrol C. 120", a formulation supposed to contain mainly a complex soluble salt of the rare earth, Zirconium in Ammoniacal solution in combination with elements such as copper, Magnesium, Zinc etc., together with Triethanolamine, has not shown any improvement in the condition of the affected palms at Bandirippuwa Estate.

Stephanitis typicus Distant (*Tingidae*) was found to cause minor injury to coconut leaves. However its role as a vector of a pathogen that may cause "Leaf Scorch Decline" has to be investigated.

2.2 Basal stem rot *by Ganoderma boninense*

No new instances of this disease were reported during the year under review.

2.3 Bud rot, Stem bleeding and Leaf blight

A few new instances of these diseases were reported from four places. They were controlled using the conventional methods.

3. BIOLOGICAL CONTROL OF *Eupatorium odoratum*

Ammalo insulata (*Arctiidae*), a leaf eating catepillar was mass bred in the laboratory and releases were made in various parts of the country. Caterpillars were also hand collected in several thousands from fields where they were found and released in new areas. A total of 185,825 caterpillars were released at 47 sites where a thick, luxuriant growth was present extensively.

This beneficial insect has become established in the country. Hundreds of acres of the weed have been completely defoliated by it. All the leaves and buds with tender stems have been eaten by the larvae, leaving only the hard stem at several release points. However it has not become established at every release point. In most of the defoliated areas, populations of this insect did not persist, to cause repeated defoliations and bring the weed under control. As a result, the defoliated plants produced new shoots with the onset of rains. In a few localities there have been resurgence of the larvae at former release points a few months after the initial defoliation.

The efficiency of *A. insulata* is partly reduced by the following newly recorded natural enemies:

A. Parasities

1. *Apanteles creatonoti* Vier (Braconidae)
2. *Exortista* sp. (Tachinidae)

B. Predators

3. Sycanus sp. (*Reduviidae*)

A few consignments of adults of the flower-eating weevil, *brunneonigrum* (Curculionidae) were imported from the Commonwealth Institute of Biological Control and released on flowers of E. odoratum directly in the field. Two months after release they were seen on flower heads at the same release points. However whether these will establish and control the weed is yet unknown.

4. MISCELLANEOUS

The Biological control Laboratory in Colombo continued to function in 1975. Dr. P. R. Dharmadhikari, F. A. O. Expert, continued to guide the staff of the Crop Protection Division in Biological control of pests and weeds of coconut. Messrs R. Mahindapala and B. H. Rohita, Research Assistants, were abroad undergoing post-graduate training in Plant Pathology and Agricultural Entomology respectively.

The following paper was read at the 31st Annual Session of the Sri Lanka Association the Advancement of Science (1975) :

Liyanage, A. de S. Peries, O. S. and Kanagaratnam, P., 1975

Ganoderma root and bole rot of coconut : A new record.

P. KANAGARATNAM
Officer-in-Charge
Crop Protection Division

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REPORT OF THE BIOMETRY UNIT – 1975

1. STATISTICAL SERVICE

Analyses of experimental data of all research Divisions and also those of experiments carried out in collaboration with the Faculty of Agriculture were attended to.

Designs too were provided for a number of new experiments.

Details of such work done have been given in the quarterly reports submitted during the year and will be shown in the Annual reports of all research Divisions.

2. RESEARCH

(i) Calibration Trial

The recordings of vegetative and yield characters of the palms in this experiment were carried out without interruption.

(ii) Watering Experiment

This experiment was maintained as per schedule. However, constant breakdowns in the water supply system were a problem.

The response to treatments averaged over the first and second year of application is shown in Table 1.

Table 1. *Nut yields per hectare per year*

Treatment	*Nuts/hectare/annum (1974—1975)*			
	Low yielding trees	*Mid yielding trees*	*High yielding trees*	*Weighted Average*
Control	8375	10411	16181	10734
Single dose weekly ...	9007	12052	17320	11972
Single dose fortnighly ...	9262	11278	17142	11624
Double dose fortnightly	8548	12271	16378	11785

(*single dose :* 333 litres per palm)

These yields have been adjusted for pre-experimental differences by means of covariance analyses.

A reasonable response is shown even within a two-year period. It has also to be noted that the last two years were years with rainfall above average effectiveness, with the result that any response to watering would be minimal.

It was argued in our annual report for 1974 that the dosage of 333 litres of water per palm expected to simulate two inches of rain is not a reality under practical conditions of moisture infiltration, and we were hoping to increase the dosage after 3½ years which is the minimum period necessary to show the response to at least the first phase of the two-phased response of coconut yields to any stimulees. But half way during 1975, we increased the dosage by 50% without waiting for 3½ years, in order to avoid undue delay in getting results from this experiment.

(iii) Drought Index

No further work was done towards refining the drought index for crop forecasting. However, several new experiments were commenced as detailed below:

(iv) 'Copra Conversion Factor' experiment

A new experiment was commenced at Ratmalagara Estate to study certain aspects of the 'Copra Conversion Factor' when curing is done immediately after harvest. The usual estate practice in Sri Lanka is to keep nuts in the heap for one month prior to curing. When this is done, the conversion factor for copra is 32% of the weight of husked nuts.

During the second quarter another experiment was commenced at Bandirippuwa Estate where the nuts were cured at the end of the first, second, third and fourth week after harvest in order to determine the nature of the progressive decline or increase, if any, in the conversion factor with storage in the heap.

However, both these experiments presented difficulties due to the fact that when small quantities of coconut are cured in the large estate kiln, the copra got scorched.

In order to obviate this difficulty, we on the advice of the estate superintendent, are contemplating curing the nuts in boxes to prevent scorching.

(v) Bunch Thinning Trial

On a request made by the Director, C R B, a "Bunch Thinning Trial" was commenced during the year.

The objective of the experiment is to determine the effect of Bunch Thinning on the production of female flowers and on the immature nutfall in respect of the inflorescences that follow.

Thinning was done, i. e., whole bunches were cut off at different ages of the developing bunch in order to determine the age of development of the bunch at which its removal will have the highest impact. These ages were 4, 5, 6, 7 and 8 months from the date of opening of the inflorescence. Another aspect studied in the experiment is the degree of thinning. What effect would the removal of different numbers of bunches have on the female flower production and immature nutfall? The thinning rates were 4, 6, 8, 10, 12 and 14 successive bunches.

Thus in all the experiment has 5 x 6 factorial combinations of age at removal and number of successive bunches removed.

The experiment provided for four replicates consisting of four yield groups.

This experiment was maintained very satisfactorily throughout the year.

(vi) Fertilizer Responses

(a) A review of the data from all past fertilizer experiments was commenced with a view to seeing whether there is a case for amending the presently recommended fertilizer dosage.

(b) A study was made of the "Buildup of the response of Coconut to fertilizer application."

This report was prepared for the information of the World Bank Team that visited Sri Lanka during the year.

3. AGRI-METEOROLOGY

(i) Meteorological stations

The three meteorological stations at Bandirippuwa Estate, Ratmalagara Estate and Isolated Seed Garden were maintained satisfactorily.

The meteorological station at Bandirippuwa Estate is one of a network of Agri-meteorological stations spread out throughout the Island, from which the Colombo Observatory collects data. This station was further improved with the additional instruments installed by Mr. S. Iyer, the U. N. D. P. expert attached to the Department of Meteorology.

(ii) Rainfall in 1975

The rainfall in 1975 in the important coconut growing areas are shown in Table 2.

Table 2. *Rainfall in Important Coconut Growing Areas*

Station	Total Rainfall (Centimetres) 1975	1974	A. V. (55—74) (20 years)
Lunuwila (Bandirippuwa Estate)	222.12	167.23	195.45
Madampe (Ratmalagara Estate)	192.13	173.00	161.11
Chilaw	137.69	145.82	152.27
Puttalam	108.31	61.49	114.43
Kurunegala	203.86	187.86	224.13

(iii) Drought indices in 1975

The drought indices of some coconut growing areas (based on the interim method) are shown in Table 3.

Table 3. *Drought Index in the Coconut Growing Areas*

Area	Drought Index: Mean for 10 years	Drought Index: Range	Drought Index for the year: 1973	1974	1975
1. Thangalla ...	152.0	30.1 — 414.6	68.8	251.9	58.5
2. Kudawewa ...	196.0	0.0 — 457.6	409.8	151.4	141.9
3. Wariyapola ...	213.0	0.0 — 526.8	413.8	117.0	43.0
4. Kuliyapitiya ...	152.5	0.0 — 288.2	370.8	48.2	68.8
5. Madampe ...	320.9	0.0 — 569.1	523.9	123.9	282.2
6. Lunuwila ...	146.1	0.0 — 407.7	185.8	137.6	202.2
7. Palavi ...	536.4	43.0 — 885.6	523.9	902.4	599.2
8. Rajakadaluwa ...	278.9	0.0 — 465.4	446.0	355.3	160.0
9. Battuluoya ...	447.2	167.9 — 754.8	628.5	938.0	363.0
10. Negombo ...	141.6	0.0 — 305.4	288.2	188.4	325.2
11. Giriulla ...	60.1	0.0 — 127.3	141.9	55.1	43.0
12. Kurunegala ...	113.6	0.0 — 254.6	210.8	55.1	43.0
13. Polgahawela ...	100.0	0.0 — 217.1	68.8	0.0	98.1

(iv) Crop prospects for 1976

In most areas there will be an improvement in coconut yields over average yields. The dry zone coconut belt from Chilaw to Puttalam will show relatively a higher improvement as compared to 1974, in which year these areas did not do well compared to the overall increases shown in other coconut areas.

(v) Forecast of Total Production in Sri Lanka for 1976

(a) Verification of forecast for 1975

Production forecast by C. R. B. for 1975	= 2771 million nuts
Production actually realised for 1975	= 2773 „ „
Error of forecast	= 0.1%

(b) Forecast for 1976

Forecast of production for 1976	= 2857 millions
% increase expected over 1975	= 3.0%

4. PRODUCTION AND EXPORTS (1975)

The estimated production of coconuts for the year 1975 is 2773 million nuts. This is 17.8% more than in 1974, 5.8% more than the last 5 year average and 11.9% lower than the previous record production of 1964.

The nut equivalent of exports for 1975 is 853 million nuts. This is 82.2% higher than the exports of 1974; 5.9% higher than the last 5 year average and 47.5% lower than the previous record of 1964.

The average value of nut products per 1000 nuts in 1975 is Rs. 465/-. This is 45.1% lower than in 1974, 18.8% higher than the last 5 year average, and 45.1% lower than the record prices of 1974.

5. GENERAL

During the year the Biometrician assisted the Rubber Research Institute, the University of Sri Lanka, the Bureau of Ceylon Standards, the Sri Lanka Sugar Corporation, the Department of Agriculture and the Cotton Research Station, Udawalawe, in various capacities as Consultant, Visiting Lecturer, Participant of Committees and Advisor.

The Staff of the Biometry Unit assisted the Coconut Cultivation Board in designing a sample survey of coconut lands in the Vanathavillu Scheme and also in the preparation of the report.

Mr. D. T. Mathes, Graduate Technical Assistant, passed the Diploma in Statistics examination conducted by the Vidyodaya Campus.

Mr. P. Sunderalingam, Technical Assistant, too followed the Diploma in Statistics course of the Vidyodaya Campus.

6. PERSONNEL

The staff as at the end of 1975 were as follows :—

1. Biometrician	—	V. Abeywardena, F.I.S. (Lond.)
2. Graduate Technical Assistant	—	D.T. Mathes B.Sc. (Cey.) Dip. Stat. (Vidyodaya)
3. Technical Assistant	—	P. Sunderalingam, B.Sc. (Ceylon)
4. Senior Lab and Field Assistant	—	G. Karunasena
5. Lab and Field Assistants	—	(1) E. Ranjith Fernando (2) D. T. Fernandopulle (3) L. G. Fernando (4) I. Karunanayake
6. Lab and Field Attendants	—	(1) W. E. R. Chandrasiri Fernando (2) W. B. Protus Fernando

V. ABEYWARDENA
Biometrician

Ceylon Cocon. Q. (1976) **27**, 46-47
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REPORT OF THE PLANTING DIVISION – 1975

1. PERSONNEL

Appointments: Messrs. M. A. Mervin Joseph, G. H. M. Somaratne, M. P. Dharmadasa, and J. A. Sunil Lakshman were appointed as Nursery Attendants in 1975.

Transfers : Mr. M. S. C. Samaranayake (Assistant Planting Officer — Advisory) was transferred to Inter cropping Division as Research Assistant.

Mr. M. S. Premasiri, Clerk/Typist was transferred to Planting Division from Pottukulama Research Station, Pallama.

Mr. K. D. Jathiratne, Clerk/Typist was transferred to Pottukulama Research Station from Head Office.

Mr. J. Mathews, Nursery Attendant was transferred to Alampil Nursery from Ibbagamuwa Nursery.

Mr. I. Joseph Fernando, Clerk/Typist was reverted to Planting Division as Nursery Attendant from the Administration Division.

Interdiction : Mr. D. L. Karunanayake was interdicted.

Appointments cancelled : Mr. M. S. Premasiri's appointment as Clerk/Typist was cancelled by the Coconut Research Board.

2. Fifteen Nurseries were maintained during the year 1975.

3. Seednuts planted for issue of Seedlings in May/June and Oct./Nov, 1975 Seasons

Nursery	*May/June 1975*	*Octo/Nov. 1975*	*Total*
1. Alampil Nursery	nil	62,500	62,500
2. Attavillu Nursery	nil	215,241	215,241
3. Bandirippuwa Nursery	34,100	32,410	66,510
4. Eraminigolla Nursery	18,775	37,960	56,735
5. Handapangala Nursery	nil	74,000	74,000
6. Hettipola Nursery	20,000	36,820	56,820
7. Ibbagamuwa Nursery	73,710	235,235	308,945
8. Kilinochchi Nursery	nil	77,300	77,300
9. Kalawewa Nursery	nil	67,500	67,500
10. Mylambavelly Nursery	nil	72,650	72,650
11. Pallakelle Nursery	50,000	66,900	116,900
12. Koggala Nursery	32,000	40,450	72,450
13. Ratmalagara Nursery	90,700	211,865	302,565
14. Walpita Nursery	39,750	97,050	136,800
15. Wilpotha Nursery	61,825	215,020	276,845
Total	420,860	1,542,901	1,963,761

4. The total number of seedlings booked during the course of the year 1975 is 980,750 and the distribution of the above bookings is as follows :—

Seedlings booked during 1975 for Oct./Nov. 1974 season	...	87,621
for May/June 1975 season	...	247,685
for Oct./Nov. 1975 season	...	645,444
Total number of seedlings booked in 1975	...	980,750

The above bookings are scheduled according to the nurseries which is as follows :—

	Nursery	*Oct./Nov. 1974*	*May/June 1975*	*Oct./Nov. 1975*	*Total*
1.	Attavillu Nursery ...	10,038	130	75,792	85,960
2.	Alampil Nursery ...	1,774	nil	23,843	25,617
3.	Bandirippuwa Nursery ...	1,588	38,533	23,394	63,515
4.	Eraminigolla Nursery ...	1,870	13,210	15,770	30,850
5.	Hettipola Nursery ...	1,114	8,931	11,851	21,896
6.	Handapangala Nursery ...	1,141	nil	43,143	44,284
7.	Ibbagamuwa Nursery ...	11,371	30,184	124,936	166,491
8.	Kalawewa Nursery ...	1,270	150	43,276	44,696
9.	Kilinochchi Nursery ...	100	nil	14,011	14,111
10.	Koggala Nursery ...	2,060	26,941	32,558	61,559
11.	Mylambavelly Nursery ...	8,331	nil	34,119	42,450
12.	Pallakelle Nursery ...	15,625	18,488	62,583	96,696
13.	Ratmalagara Nursery ...	11,517	49,830	62,240	123,587
14.	Walpita Nursery ...	1,993	39,002	49,707	90,702
15.	Wilpotha Nursery ...	17,829	22,286	28,221	68,336
	Total ...	87,621	247,685	645,444	980,750

Summary of bookings for the year 1975

	Oct./Nov. 1974	*May/June 1975*	*Oct./Nov. 1975*	*Total*
Seedlings booked by Govt. Agents ...	19,447	nil	105,925	125,372
Seedlings booked by Govt. Depts. etc.	5.845	3,607	175,657	185,109
Seedlings booked by Agric. Pro. Com. etc.	3,000	13,710	75,466	92,176
Seedlings booked under Small Holdings Subsidy Scheme ...	19,116	21,977	28,713	69,806
Seedlings booked under Crop Diversification Scheme ...	nil	5,719	890	6,609
Seedlings booked by Public ...	40,213	202,672	258,793	501,678
Total ...	87,621	247,685	645,444	980,750

5. Seedlings Issued : 1,115,729 seedlings were issued during the year 1975 and the distribution according to nurseries is as follows :

Nursery		*Oct./Nov. 1974*	*May/June 1975*	*Oct./Nov. 1975*	*Total*
1. Alampil Nursery	...	18,783	nil	20,637	39,420
2. Attavillu Nursery	...	63,403	nil	68,926	132,329
3. Bandirippuwa Nursery	...	1,165	22,036	14,109	37,310
4. Eraminigolla Nursery	...	14,511	13,629	5,133	33,273
5. Handapangala Nursery	...	10,171	nil	37,431	47,602
6. Hettipola Nursery	...	10,058	11,160	5,190	26,408
7. Ibbagamuwa Nursery	...	32,540	36,739	81,485	150,764
8. Kalawewa Nursery	...	7,906	nil	42,199	50,105
9. Kilinochchi Nursery	...	11,757	nil	2,846	14,603
10. Koggala Nursery	...	8,569	24,214	27,906	60,689
11. Mylambavelly Nursery	...	4,880	nil	38,210	43,090
12. Pallakelle Nursery	...	19,398	35,632	22,319	77,349
13. Ratmalagara Nursery	...	55,061	77,919	45,907	178,887
14. Walpita Nursery	...	31,720	30,833	20,521	83,074
15. Wilpotha Nursery	...	68,840	47,262	24,724	140,826
Total	...	358,762	299,424	457,543	1,115,729

J. A. CADELIS
Acting Planting Officer

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REPORT OF THE PUBLICATIONS/PUBLICITY UNIT AND LIBRARY – 1975

1. JOURNALS

The following issues of the C R I Journals were published during the year:

1.1 Ceylon Coconut Quarterly

Vol. XXV Nos. 1/2 and 3/4

1.2 Pol Pawath

Vol. VI No. 1

2. ADVISORY LEAFLETS

With the assistance of the National Metrication Authority steps were taken during the last quarter of the year to introduce metric measurements into the CRI advisory leaflets. Apart from this the routine work of revising and reprinting of advisory leaflets was carried out as and when found necessary in order to update the subject matter and maintain the stock position.

The following leaflets were revised wherever necessary and reprinted during the year :

In Sinhala	—	Nos. 16, 20, 24, 25, 29, 33, 37, 40, 46, 47, 48, 49
In Tamil	—	Nos. 25, 38, 43, 44
In English	—	Nos. 5, 41, 52.

3. VISITORS

During the year the Institute received 11,759 students from 156 schools, 55 university students and 54 visitors from overseas.

4. LIBRARY

4.1 New Additions

During the year under review 80 new books were added to the library bringing the total number to 3490. Six new journals were received in exchange for CRI publications. The total number of journals acquired on subscriptions and on exchange stands at 236.

4.2 Grant Received

The Institute was in the fortunate position to receive a grant of books and journals to the value of £. 1750.00 from the British Council under the ODA Book Presentation Programme. 30 books and subscriptions for 23 journals have already been received under this programme.

4.3 Information Service

Four issues of the *Library Bulletin* were produced at quarterly intervals.

5. MUSEUM

During the year under review the C R I Museum at Lunuwila was equipped with the following : two ordinary glass almirahs, two octagonal glass almirahs, a ten - feet high model of a coconut palm depicting coconut products, a working model of a fibre mill, a working model of a desiccated coconut mill, a model of a vinegar factory and a model of copra kiln.

6. PUBLICATIONS

Mr. M. S. S. Fernandopulle, Publications/Publicity Officer contributed an article entitled "Better Returns from Intercropping" to the Ceylon Observer, Magazine edition of 23.02.1975.

7. PERSONNEL

Mr. M. S. S. Fernandopulle, Publications/Publicity Officer resumed duties on 30.09.1975 after successfully completing his Postgraduate Diploma Course in Journalism for Developing Countries at the Indian Institute of Mass Communication, New Delhi and studies at the Central Plantation Crops Research Institute, Kasaragod, Kerala.

M. S. S. FERNANDOPULLE
Publications/Publicity Officer

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REPORT OF THE ADMINISTRATION DIVISION – 1975

The staff of the Coconut Research Board at the end of 1975 was as follows :—

Grade	*Contract*	*Special*	*Class I*	*Class II*	*Class III*	*Class IV*	*Total*
Contract Officers	3						3
Executive grade			3	2	19	4	28
Technical/Supervisory		11	11	22			44
Intermediate			5	2			7
Clerical & Allied			18	20			38
Operative			19	35			54
Minor grade		26	103	124			253
Total	3	37	159	205	19	4	427

BOARD

Dr. J. W. L. Peiris, B.Sc. (Lond.), Ph.D (Lond.), member of the Coconut Research Board was appointed as Actg. Chairman, C R B with effect from 1st September, 1975 in succession to Dr. J. Sivapragasam who resigned from the Board.

Staff

Appointments, Retirements, Resignations and Acting appointments.

Dr. U. Pethiyagoda, B.Sc. (Cey.), Ph.D. (Lond.), D.I.C. was appointed as Director, Coconut Research Board in succession to Dr. W. R. N. Nathanael who retired from the service of the Board. Dr. Nathanael has served the Board for a period of over 35 years.

Mr. D. H. C. Dissanayake, C. A. S., Assistant Rubber Controller was appointed as Deputy Director (A & F) of the C. R. B. with effect from 9th December, 1975 on secondment in place of Mr. K. D. J. Wilmot who ceased to be in the service of the Board.

Mr. P. D. L. Fernando, Planting Officer, went on leave preparatory to retirement. Mr. J. A. Cadelis, Nurseries Inspection Officer was appointed as Actg. Planting Officer.

Mr. Ananda Senaratne resigned from the post of Engineering Assistant. Mr. K. E. Abeysinghe, Clerk of Works, was appointed as Actg. Engineering Assistant.

Mrs. S. P. Seneviratne, resigned from the post of Asst. Administrative Officer. Mr. F. H. B. Felix Silva, Office Assistant, was appointed as Actg. Asst. Administrative Officer on relinquishment of her duties.

The following internal promotions were made during the year:

Executive Grade : Mr. M. A. T. de Silva, Research Assistant B.Sc. (Lond)., M.Sc. (Lond)., Soil Chemistry Division as Research Officer with effect from 1st January, 1975.

Mr. D. E. F. Ferdinendez B.Sc. (Lond.), M.Sc. (Lond.), as Research Assistant with retrospective effect from 15th November, 1974.

Technical & Supervisory Grade : Mr. M. B. S. Kurera, Book-Keeper, as Accounting Assistant with effect from 01. 09. 1975.

Intermediate Grade: Mr. G. D. Abeywardena, Stenographer (Sinhala) from Class II to Class I with effect from 21. 07. 1975. Mrs. H. Fernando, Stenographer (Eng.) from Class II to Class I with effect from 21. 07. 1975.

Clerical & Allied Grade: Mrs. K. M. A. Nonis, Accounts Clerk, from Class II to Class I with effect from 21. 07. 1975.

Operative Grade: Mr. L. Dias, Transport Officer, from Class II to Class I with effect from 21.07.1975.

The following employees ceased to function as Clerks of the Coconut Research Board:

Clerical & Allied Grade: Messrs B. M. Dingiribanda, R. D. Dayasena, I. Joseph Fernando, M. S. Premasiri, K. L. D. Dharmasiriwardena, W. K. A. M. Somatilake and Miss A. de Soyza.

The following employees ceased to function as two — wheel tractor operators:

Messrs J. K. Stafford Perera, T. J. G. P. Fernando, M. A. Dayawansa, M. M. Padmasena, K. D. J. L. Gunatilake, P.J.A. Fernando, M.A.D.Manchanayake, Lestor Rajapakse, M. A. Sebastian Fernando, M. P. D. D. Placidus Dominic.

The following internal appointments as Lab/Field Attendants with effect from 1975.08.01. were made during the year:

Messrs F.H.A.J. Ryle Silva, R.M.P.T. Perera, D.M. Sarathchandra, K.S.N.M. Fernando, H.A.M. Joseph, G.M. Somaratne, J.A. Sunil Luxman, M.P. Dharmadasa, R.A.L.C. Fernando.

The following internal appointments to the Minor Grade Class II were made during the year with effect from 1st August, 1975:

Messrs W.A. Raj Fernando, N. Gamage and J. A. Anthony Perera as Office Attendants, T. Upasena, M. A. Sirisena, L. Karunatillake, M. R. S. Paris, V. K. C. W. N. Perera and M. T. Sirisena as Labourers.

RETIREMENTS

The following employees retired during the year :

Mr. W. S. Fernando, Driver, retired from the services of the Institute after a period of over 20 years of service.

Mr. J. M. Abilinu, Watcher, retired from the services of the Board after a period of over 10 years of service.

Toddy Tappers' Training Scheme: This scheme which was inaugurated in January, 1973 was reorganised during the year and the training part of the Scheme was brought directly under the Coconut Research Board while the tapping projects were handed over to the Katana Electorate and the Wennappuwa Electorate Co-operative Societies. All recruitments to the training scheme staff and the procedure with regard to the efficient running of the scheme were regularised.

WELFARE

Housing

The Housing Committee continued to function with Deputy Director (A & F) as Chairman and representatives of trade unions. A few meetings were held during the year.

Workmen's Compensation

The C R B paid for all temporary disablement cases which covered mainly the wages for the "first seven waiting days" as an additional privilege pending re-imbursement from the Insurance Corporation. There were no fatal or partial permanent disablement cases.

Recreation, Co-operative and cultural activities

The club participated in the Govt. cricket tournament matches, and also organised the annual Christmas party and club nights. The C R I Multipurpose Co-operative Welfare Society continued to function and the Board gave all facilities to expand its activities for economic development. The C R B Art Circle organised its annual Sinhala New Year celebrations and also organised excursions to historical places. The C R B Catholic Association organised religious ceremonies and annual visits to places of worship.

Industrial relations

The administration participated in discussions with all trade unions to maintain cordial relationship.

B. K. D. S. SAMARASINGHE
Deputy Director (Administration & Finance)

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REPORT ON ESTATES – 1975

(1) BANDIRIPPUWA ESTATE, LUNUWILA

Area Statement		*Hectares*	*A*	*R*	*P*
Bandirippuwa (1)		61.92	153	0	00
Bandirippuwa (2)	"A"	47.85	118	0	38
Bandirippuwa (2)	"B"	24.25	59	3	26
Bandirippuwa (2)	"C"	14.08	34	3	07
Total		148.10	365	3	31
Research		58.68	145	0	00
Estate		82.19	203	0	17
Building, etc.		6.88	17	0	00
Paddy, etc.		0.34	0	3	14
Total		148.09	365	3	31

DISTRIBUTION OF AREA BY BLOCKS

Blocks		*Research*				*Estate*				*Total*			
		Hectares	*A*	*R*	*P*	*Hectares*	*A*	*R*	*P*	*Hectares*	*A*	*R*	*P*
B/E (1)	1	1.22	3	0	00	10.52	26	0	00	11.74	29	0	00
,,	2	—	0	0	00	5.67	14	0	00	5.67	14	0	00
,,	3	4.86	12	0	00	4.45	11	0	00	9.31	23	0	00
,,	4	2.02	5	0	00	15.02	37	0	17	17.04	42	0	17
,,	5	3.64	9	0	00	5.26	13	0	00	8.90	22	0	00
,,	6	2.43	6	0	00	2.02	5	0	00	4.45	11	0	00
B/E (2)	"A"	26.71	66	0	00	20.23	50	0	00	46.94	116	0	00
,,	"B"	10.52	26	0	00	12.55	31	0	00	23.07	57	0	00
,,	"C"	7.28	18	0	00	6.47	16	0	00	13.75	34	0	00
		58.68	145	0	00	82.19	203	0	17	140.87	348	0	17
Building, etc.										6.88	17	0	00
Paddy, etc.										0.34	0	3	14
										148.09	365	3	31

CENSUS ENDED 1974

	1	*2*	*3*	*4*	*5*	*6*	*'A'*	*'B'*	*'C'*	*Total*
Full Bearing	1,609	672	1,253	1,919	1,108	594	4,302	2,152	1,490	15,099
Tapping Palms	6	—	83	13	—	85	415	430	427	1,459
Duds	1	1	2	67	4	4	54	66	37	236
Inflower	2	1	7	6	3	1	90	—	—	110
Established	16	—	15	2	—	1	163	—	1	198
Seedlings	8	—	12	24	1	3	1,469	472	3	1,992
Vacancies	152	103	133	405	245	87	652	495	262	2,534
Total	1,794	777	1,505	2,436	1,361	775	7,145	3,615	2,220	21,628

COMPARATIVE RAINFALL 1974-1975 WITH RESPECTIVE WET AND RAINY DAYS

Month	1974 Centi-meters	1974 Inches	1974 Wet days	1974 Rainy days	1975 Centi-meters	1975 Inches	1975 Wet days	1975 Rainy days	Total Rainfall 1969/1975 Centi-meters	Total Rainfall 1969/1975 Inches	5 year Average Rainfall 1969/1975 Centi-meters	5 year Average Rainfall 1969/1975 Rainfall Inches
January	NIL	NIL	—	—	0.53	0.21	2	—	47.37	18.65	9.47	3.73
February	2.03	0.80	4	—	3.07	1.21	4	—	31.12	12.25	6.22	2.45
March	7.39	2.91	4	—	11.02	4.34	6	—	59.26	23.33	11.84	4.66
April	24.33	13.71	16	2	41.15	16.20	18	2	114.78	45.19	22.96	9.04
May	24.33	9.58	18	1	30.99	12.20	15	2	148.84	58.60	29.77	11.72
June	10.46	4.12	14	3	14.53	5.72	14	—	75.44	29.70	15.09	5.94
July	18.14	7.14	16	—	19.30	7.60	8	—	39.57	15.58	7.92	3.12
August	8.15	3.21	4	—	3.91	1.54	6	1	23.93	9.42	4.78	1.88
September	17.32	6.82	13	2	13.92	5.48	11	—	57.23	2723	22.53	4.51
October	9.45	3.72	7	—	13.82	5.44	12	1	173.30	68.23	34.67	13.65
November	13.67	15.38	7	2	45.57	17.94	22	1	117.88	46.41	23.57	9.28
December	13.77	5.42	6	1	18.01	7.09	7	—	93.22	36.70	18.72	7.34
TOTAL ...	1159.53	62.81	109	11	215.82	84.97	125	7	981.94	386.99	196.47	77.32

CROPS

Total Crop from 1971 to 1976 within the respective averages

Crops	*1971*	*1972*	*1973*	*1974*	*1975*	*Total*	*Average 5 years*
1st Crop ...	149,980	170,178	63,006	65,817	91,103	540,084	108,017
2nd Crop ...	185,612	238,852	94,330	93,628	155,473	767,895	153,579
3rd Crop ...	234,371	207,761	148,488	154,725	135,874	881,219	176,244
4th Crop ...	205,893	160,942	143,812	141,426	162,358	814,430	162,886
5th Crop ...	160,776	129,772	81,106	91,250	122,364	585,268	117,053
6th Crop ...	147,736	60,794	56,231	86,948	60,126	411,835	882,367
Total	1,084,368	968,299	586,973	633,794	727,297	4,000,731	8,800,146

DISPOSAL OF CROPS (6 Crops 1975)

Sold to Coconut Processing Board	553,591	
Converted into Copra	92,110	
Sold to Staff	25,178	
Sold to Research	2,186	
Nut Allowance	30,539	
Missing	556	
Empties	23,137	
Total ...	727,297	3.2%

Field Notes

The following field operations have been carried out during the year:

Weeding

Weeds have been affectively controlled on the estate.

Draining

All drains have been maintained in good order.

Fencing

Fencing was done in Blocks A and B respectively.

Manuring

The entire estate was manured during the year.

D. C. ELLAWELA
Superintendent, Bandirippuwa Estate.

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(2) RATMALAGARA ESTATE, MADAMPE—1975

Acreage Statement

Area	*Hectares*	*A*	*R*	*P*
Research Station	69.65	172	0	0
Estate Section	25.90	64	0	0
Roads & Buildings	2.03	5	0	0
Jungle & Waste Land	7.69	19	0	0
Nurseries	5.26	13	0	0
Total	110.53	273	0	0

Distribution of Area by Research Divisions

Division	*Hectares*	*A*	*R*	*P*
Botany and Plant Breeding	15.59	38	2	0
Soil Chemistry	25.51	63	0	0
Agrostology	21.05	52	0	0
Intercropping	6.48	16	0	0
Biometry	1.02	2	2	0
Planting Division	5.26	13	0	0
Estate Section	25.90	64	0	0
Roads & Buildings	2.03	5	0	0
Jungle & Waste Land	7.69	19	0	0
Total	110.53	273	0	0

CENSUS OF PALMS

Particulars	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*Bot. Bl.*	*Total*
Full Bearing	1,557	215	749	1,396	1,159	1,568	2,608	328	2,782	12,362
In Flower	14	—	5	10	—	—	52	—	75	156
Young Palms	10	—	—	45	—	—	60	—	93	208
Duds	35	14	30	21	7	51	35	10	5	208
Vacancies	15	11	40	51	5	70	39	17	180	428
	1,631	240	824	1,523	1,171	1,689	2,794	355	3,135	13,362

COMPARATIVE RAINFALL 1974/1975 WITH WET DAYS

Month	1974			1975			Rainfall 1969/73 Total		Rainfall 1969/73 Average	
	cm	inches	Wet days	cm	inches	Wet days	cm	inches	cm	inches
January	—	—	—	1.73	0.68	3	16.71	6.58	3.33	1.31
February	9.91	3.90	4	1.88	0.74	3	36.30	14.29	7.26	2.86
March	1.37	0.54	2	5.82	2.29	5	33.86	13.33	6.76	2.66
April	51.20	20.16	16	29.16	11.48	16	96.80	38.11	19.35	7.62
May	39.75	15.65	20	9.45	3.72	10	119.68	47.12	23.93	9.42
June	6.73	2.65	12	15.26	6.01	17	47.80	18.82	9.55	3.76
July	14.17	5.58	15	17.55	6.91	13	17.09	6.73	3.45	1.36
August	10.52	4.14	8	1.75	0.69	5	15.22	5.99	3.05	1.20
September	13.46	5.30	20	16.08	6.33	8	49.30	19.41	9.65	3.80
October	5.72	2.25	7	22.12	8.71	15	169.06	66.56	33.81	13.31
November	14.76	5.81	8	53.34	21.00	22	73.36	28.88	14.66	5.77
December	5.89	2.32	5	7.95	3.13	7	80.85	31.83	16.18	6.37
Total	173.48	68.30	117	182.09	71.69	124	756.03	297.65	150.98	59.44

Total Crops from 1970 to 1975

Pick No.	1970	1971	1972	1973	1974	1975
1	105,702	136,883	153,485	46,072	54,434	133,532
2	119,474	194,549	203,711	76,893	97,956	150,920
3	170,522	184,576	198,611	114,695	141,785	160,380
4	154,242	215,698	218,160	173,025	198,568	174,351
5	102,138	157,402	126,332	114,464	95,908	142,026
6	103,141	134,132	104,521	72,314	135,588	68,631
	755,219	1,023,240	1,004,820	597,463	724,239	830,020

Crop disposal for 1975

Nuts cured into copra	...	...	635,442
Nuts sold on contract	...	...	159,887
Allowances to staff	...	...	11,328
Nuts issued for research	...	...	4,245
Empties and rejections	...	...	15,187
Missing	...	...	3,931
Total	...	...	830,020

Copra

The 635, 442 nuts converted into copra resulted as follows :

No. 1 Copra — 86548.60 kg (340 candies 408 lbs) being 81.83%
No. 2 Copra — 15646.13 kg (61 candies 334 lbs) being 14.79%
No. 3 Copra — 3566.58 kg (14 candies 023 lbs) being 3.38%

Total — 105761.31 kg (416 candies 205 lbs)

The copra out-turn was 1526. This is inclusive of the Botanists Dwarf Palm Block nuts.

The empties and rejections percentage was 2.39%.

Field Notes

The following Research Divisions/Units continued to maintain their field experiments at Ratmalagara. Resident Officers of the respective Divisions/Units except the Biometry Unit continued to be in charge of the research work:

1. Division of Botany and Plant Breeeing
2. Division of Soils
3. Agrostology Division
4. Intercropping Division
5. Biometry Unit

A cattle herd of 99 animals was maintained by the Intercropping Division.

The herd particulars are as follows :

Stud Bulls	2
Cows	31
Heifers	51
Bull Calves	15

GENERAL

All field works estimated by the estate section for the year have been carried out. Drains and drain bunds were well-maintained. All estate palms were manured with 4.55 kg (10 lbs) of C. R. I. 'C' Mixture per palm. The manure was broadcast in the 182.88 cm (6 ft) area round the base of the palm and the soil was turned over with mamoties. All buildings, fences and estate roads were well-maintained. The only vehicle on the estate, the estate tractor was continually under repair. This research Station should be provided with an additional tractor and a jeep for greater efficiency and better service.

R. M. de SILVA
Superintendent
Ratmalagara Estate